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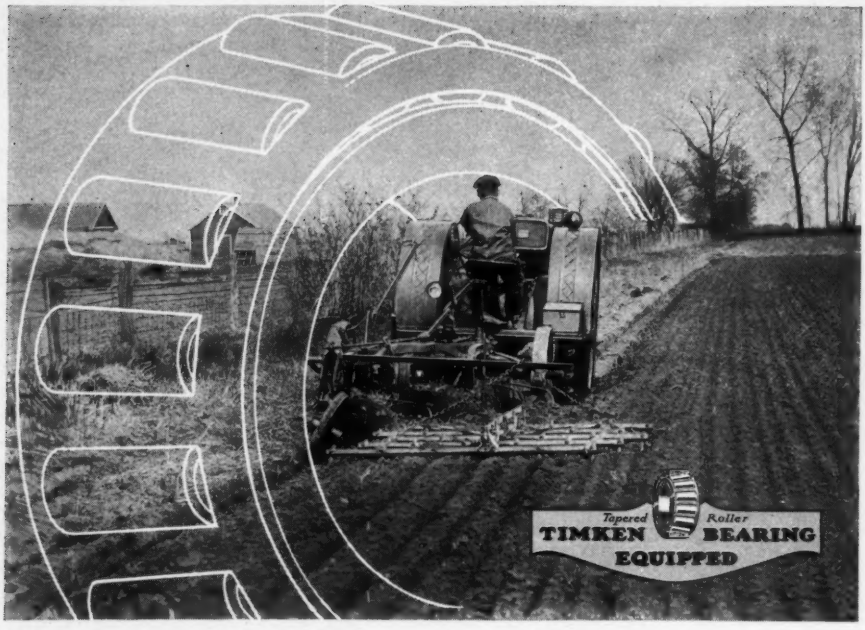

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The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Managing Editor* SID NOBLE, *Editor*

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VOLUME XVI NUMBER FIVE

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WHEN MAY BRINGS FORTH HER SHADES

Better Crops with PLANT FOOD

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Credit Yourself
— With —
Piety Plus

By Jeff McDermid

SOMEHOW spring suggests preachers and long sermons, although this orthodoxy of mine may surprise you. It is because as a small boy I used to be forced into a pew on Easter Sunday when the first breath of the awakening woods and marshes wafted through the windows. Chaps about my age can share these memories of droning hours spent in protesting piety.

Father wiggled into his Sabbath regimentals after attending to the barn chores. His struggles with hardpan soil, white grubs, and the Deacon's mortgage on our farm were only matched in awkward intensity by the Boiled Shirt Bother. Fortunately it came but once a week, or when he was chosen to act as a pallbearer.

I can see him yet, through a misty vista, standing with legs encased in wrinkled red flannels, arms upraised in gyrations like a mystic Druid of eld, and his head and shoulders completely hidden in the knobby and scratchy confines of a laundered stiff "buzzum" pleated shirt. When his face emerged, red and wrathy, with a few razor nicks visible from a hasty shave, he shouted for Mother to fasten

his angelic collar and adjust his ready-tied cravat, the kind that fastened on with hooks. (Father preferred buckles and hooks for himself to speed preparations, even as he did for the draft horse harness.)

Whereupon he would glare at me and ask if I had blacked the family foot-gear. We didn't "shine" our brogans in those days. They were "blacked." Stoves were polished, but shoes were not. This smutty task in leather lacquering was mine on Sabbath mornings. Once I spilled part of a bottle of fluid shoe tonic into my Uncle Robert's best ones. That was the day I didn't go to church, and I spent the time pondering how one might induce more accidents to happen.

HOW many bushels of peppermint lozenges Father consumed at church in lieu of burley fine-cut, I dare not estimate. Mother's puffy sleeves, like fat Wiltshire hams at her shoulders, those fingerless mitts as she turned the pages of the hymn-book, the girlish be-ribboned braids in the pew ahead crying aloud for burdock burrs, the collection boxes with long handles like corn-poppers, and my red-haired chum who monkey-shined to give me the giggles—of such I fear were my rituals.

With tender humor I recall that time when Father was weary from a week of threshing and fell into a quiet, nodding slumber during a discourse by Reverend Porter on the text from Ephesians: "Awake, thou that sleepest and arise from the dead!" When he reached the "fourthly" of the sermon his words fell like sinkers on my bent head, and I nudged slyly at my sire. On went the solemn tones from the oaken pulpit:

"By one who sleeps we are to understand a sinner satisfied in his sins, contented to remain in his fallen estate and to live and die in it; one who is ignorant of his disease and the remedy for it; one who never regarded the voice of warning 'to flee from the wrath to come;' one that never saw his danger of hell fire or called out in anguish, 'What must I do to be saved?' "

There were probably many irksome things that my Father stood in need of being saved from; things perhaps more real to him than the visions of vitriol vouchsafed by the well-meaning minister. *Maybe* I was one of them, and I am sure the wrestling with our stony farm *was*. But our dear old Divine, like many others of his day in all creeds and of all cloth, thought chiefly of the world hidden behind the Veil of Mystery and promised in the allegory of the psalms. To be sure their ministry included its full share of sick visiting and family counsel, but the main reason they expected the parish to anticipate major rewards in Heaven was somewhat tied up with their own meager sustenance. Our own preacher never received more than six hundred dollars a year. Luckily, there was no gas tax!

SOME readers into whose hands this book may fall perchance have experienced no similar churchly conditions. Our family comes from no cathedral community and our sky-pilots labored in little meeting houses, white steeples among the hills. I stand on no specific creed, nor do I exclaim as did my zealous aunt of the home mission guild: "Why can't they all join one communion? Why can't they all be Methodists?"

Ecclesiastical tomes are not overwhelmingly preponderant in my library. (Excuse big words.) My library is good enough, what there is of it, and there is enough of it, such as it is. Not caring to be hypocritical, I frankly affirm that I get books for frequent reading purposes, not for historic value or pretty bindings to match the drapes. Hence I need explain little about the lack of sanctity in my sanctum.

Yet somehow I was left a legacy from the family before me which can-

(*Turn to page* 61)

This high-producing orchard has had complete fertilizer for years. A Neubauer test shows that the top 16 inches of soil contain 92 lbs. of available phosphoric acid and 254 lbs. of available potash per acre. The pH is 5.9. The sod is largely clover, alfalfa, and sweet clover.

Profitable Trees

By T. H. Blow

Springfield, Massachusetts

TESTS of 16 southern New England orchards show that the available phosphorus and potash are too low for good growth. The only exceptions are on three soils where complete fertilizer has been used for several years.

Soil samples of the top 16 inches of these soils were secured by making borings with a soil auger. In each orchard many borings were made so as to get representative samples. Neubauer tests were made of these. In this test rye seedlings are grown on sand and duplicated on orchard soil. At the end of 17 days the seedlings are analyzed for available phosphoric acid and potash. The amounts of available phosphoric acid and potash in the soil are determined by subtracting the amounts of the plant foods found in the seedlings grown on the sand from the amounts in those grown on the soil.

This method of determining the needs of the soil is being used extensively in Germany, where it was originated. Soils to be productive should show a reading of at least 2.5 milligrams of phosphoric acid and 10 milligrams of potash per 100 grams of soil. By multiplying the number of milligrams by 20, we get the number of pounds per acre. This means that a productive soil should contain 50 pounds of available phosphoric acid and 200 of available potash per acre.

(*Turn to page 59*)

An Industry Rebuilt

By L. R. Combs

Extension Editor, Iowa State College

ANOTHER plant disease has met its Waterloo. More than 30 years ago an organism later identified as *Fusarium niveum*, causing watermelon wilt, ambushed itself in the soils of certain truck-growing regions. By 1905 it was becoming a serious enemy and by 1915 it had driven truck farmers from thousands of acres of melon-growing land.

For 10 years the growers fought a futile war against this disease. They tried various methods but to no avail. Then scientists from Iowa State College, plant pathologists trained in the methods of plant disease warfare, moved quietly into the field and arrayed their knowledge of plant breeding, their laboratory and greenhouse equipment, and unmeasured patience against the deadly wilt.

In 1930 fields in southeastern Iowa, one of the important melon-growing centers, which had not produced a crop for 15 or 20 years and which had been infested with the wilt organism all that time, produced crops of marketable melons. Seed produced in those fields will be distributed among commercial growers and used to grow 4,000 or more acres. These 4,000 acres will produce 2,000 to 3,000 cars in a territory where the number of cars of melons shipped out during the past 10 years has been negligible. It is predicted on good authority that within a few years this seed will enable melon growers all over the Midwest to produce melons regardless of whether *Fusarium niveum* lurks in the soil or not.

Acres Abandoned

Muscatine Island, sometimes called the gateway by which sub-tropical crops are brought to the door of Iowa, where once grew field after field of green-backed, red-fruited melons, now lies idle and barren. In no place in America is there soil better suited to the production of melons and other truck crops than in this area, once an island in the Mississippi, now filled in on one side and connected to the mainland. Here and along the Mississippi River Valley in southeastern Iowa lie thousands of acres of soil unsurpassed for melon growing. That is, it was unsurpassed until wilt early in the twentieth century began to infest the soil

The above picture shows just a few of the thousands of acres abandoned in southeastern Iowa because of watermelon wilt. In the background may be seen the abandoned house and buildings of a former farm home.

and take its deadly toll each year. A trip through this territory at any time during the past half dozen years or at the present reveals farm after farm abandoned, overgrown with weeds. In the background may be seen tumble-down barns and unpainted, weather-beaten houses, mute evidence of the disastrous effect of the attack of the *Fusarium niveum* which forced the owners to seek other occupations.

Here are seeds drying in the sun after being taken from the melons. Enough seeds are shown here to plant hundreds of acres.

Some farmers have turned to other crops, but few have been able to make the profit which melons made for them. The abandoned acreage was too large to turn over altogether to production of sweet potatoes and cantaloupes. In other parts of Iowa and in other Midwestern States are many districts where watermelon growing has diminished to one-tenth or less of its former importance and profitableness.

Watermelon Day

At one time the towns in southeastern Iowa, Conesville, Muscatine, and others, were veritable beehives of industry during the melon-shipping season. A visit to one of those towns in late August or early September would have revealed trainloads of melons on the track ready to be shipped out. "Watermelon Day," a festival occasion observed in many of these towns at that time, brought farmers and townspeople by the hundreds to the center of activities. Farmers would drive from miles around bringing with them wagonloads of melons. These melons would be used to feed the crowds in celebration of the completion of another successful season. "Watermelon Day" to these people meant what "Apple Blossom Festivals" mean to northeastern Kansas and what Wheat Festivals mean to the wheat belt.

Although the watermelon industry does not rank in general importance with that of wheat growing and hog or cattle feeding, it is important where truck crops are grown. The loss of this crop in areas suited to melon production is serious when it is realized that much of the land which will return a net profit of more than $100 an acre when in melons will not produce much more than 10 bushels of corn to the acre. The pathetic part of the whole situation in Iowa is that the State once produced enough melons for her own use and shipped out thousands of carloads to other States. For the past few years she has been buying them and paying high interstate freight rates.

Records of the W. H. Hoopes and Sons firm of Muscatine, formerly one of the largest produce houses handling melons in that territory, give evidence of the disaster suffered by the melon-growing industry. In 1906 this one firm alone shipped 139 carloads. In 1912 the shipment had increased to 305 cars. By 1915—the wilt was getting a good hold in the soils by this time—the shipments had drop-

Watermelons from which seeds are to be taken are "threshed" or ground up in a machine such as shown above. The resulting pulp is placed in barrels and allowed to ferment while the seeds go to the bottom after which they are washed and dried.

ped to 40 cars; in 1916, 72 carloads; and in 1917, 48 cars. By 1925, 36 carloads were shipped and in 1926, only 23 carloads. The estimated total for 1928 was 15 cars. Had not wilt virtually destroyed the industry, it is probable that this firm would now be shipping more than 500 cars if the business had continued to grow as expected.

Thus the melon-growing industry has declined to about 10 per cent or less of its former importance. The acreage of melons in Iowa in 1900 was 10,000, while in 1926 it was 1,041 acres. In Lee, Louisa, and Muscatine counties the acreage dropped from 8,000 in 1900 to 641 in 1926, or to eight per cent of the acreage in 1900. Fields which once produced crops of melons have lain idle for 16 years or more.

The Coming of the Scourge

The prevalence of watermelon wilt was first noted in the South in 1894 by E. F. Smith, a plant pathologist of the United States Department of Agriculture. About 1900 it was generally noticed by growers in Iowa, many of whom thought it was the result of activities of a root-boring insect. George Van Horn, Conesville, Iowa, one of the oldest growers in that section, says that he first noticed in 1896 what was later identified as wilt. By 1905 many growers found it unprofitable to grow melons on land which had been in that crop continuously. George Corwin, Fruitland, also noticed that wilt was becoming a serious factor by 1900. By 1919 the acreage had been reduced 65 per cent, and as the soil became more generally infested, melon growing was almost abandoned.

Growers would plant their seed in the spring and hope for a good crop. The plants would come up strong and green. Then one day the farmer would notice the plants wilt in the heat of the day. They might recover at night, but within a few days the leaves would turn a sickly green with yellow edges and in a short time entire fields would be dead, labor and seed wasted and prospects of a crop and any return from the soil ruined for that year. In some cases the plants "damped-off," that is, the tissues at the soil line became weakened, the plants fell over, and soon died. If none of the above symptoms were shown, the plants might appear stunted as if plant food were lacking. Sometimes the seed did not even germinate; the fungus of the wilt strangled the plant before it could break through the surface of the soil.

The Call to Arms

But the melon growers did not sit

calmly by and give up their land without a struggle. In January, 1925, they held truck growers' institutes at Muscatine and at Conesville. J. J. Wilson, county agent in Muscatine at that time, was instrumental in getting the work started. He has "grown up" with the wilt-resistance development and in 1929 took charge of the field work there. These institutes were attended by members of the Iowa State College staff who had been interested in the problems of the truck growers for some time. Among these college men was D. R. Porter who did much of the work in developing the new varieties. The growers asked for help in solving their problem. The next year work was under way. The Conesville Experiment Association was formed. The College agreed to furnish an investigator and to supply seed, labor, materials, and greenhouse facilities while the Association would furnish a field laboratory and sufficient land on which to conduct experiments.

Turn to Wilt Resistance

It was known that the only practical solution of the problem was the development of wilt-resistant strains. No dust or other seed treatment could be found which would control the wilt. Growers and college men had noted that there seemed to be slightly less wilt in plants grown on soil which had been treated with certain fertilizers. However, tests showed that there was no appreciable difference between the amount of wilt in plants grown on soil treated with lime, commercial fertilizers, or barnyard manure and that in plants grown on untreated soil. Crop rotation helped little. A field which produced a poor crop of melons because of wilt in 1910 laid idle for 16 years. Melons were planted in 1926 and wilt killed more than half the vines.

However, it was known that some varieties of melons were more resistant than others and that some of the unedible citrons were almost 100 per cent resistant. Herein, scientists concluded, lay the solution of the problem of rebuilding the melon industry. This work has been done by various members of the Iowa Experiment Station staff under the direction of I. E. Melhus, now head of botany and plant pathology at Iowa State College.

Find the Strain

In 1925, Dr. O. H. Elmer and Dr. S. M. Dietz were inspecting a field of melons on the farm of Frank Everett, near Oskaloosa, Iowa. They noticed

(*Turn to page 57*)

Everyone likes a nice, juicy slice of watermelon and these truck farmers are sure appreciating their own product. This group is eating "Pride of Muscatine" on the Roy Jean Farm in southeastern Iowa where melons had not been raised for 15 years because of the wilt organism in the soil.

Better Sweet Corn

By R. F. Thomas

Houlton, Maine

FOUR fertilizer demonstrations were carried on in central Maine last year to check up the Hoffer stalk test as a diagnostic agent for the fertilizer needs of sweet corn. Stalk tests made in 1929 on three of these farms indicated that fertilizers higher in potash would increase yields. The 1930 results showed that the extra potash increased the yields of cut corn as much as 1,227 pounds per acre, the average being 855 pounds.

In 1929 the Hoffer stalk test was made on 33 sweet corn fields in central Maine the latter part of August. Representative stalks were selected in each field. Each stalk was split and a chemical used between the nodes to determine whether the plant had received sufficient nitrogen. Abundance of nitrogen was shown by the stalk turning blue. If nitrogen was low, no color developed. Another chemical was applied to the joints or nodes of the split stalks. If a red color developed it denoted the presence of iron. Excessive amounts of iron in the node stops the circulation of the plant and results in decreased yields. Excessive iron in the nodes indicates that the corn is not getting enough potash.

Show Need for Potash

Very few of the corn fields tested in 1929 showed lack of nitrogen. When fertilizers containing 4 per cent of potash had been used, 78 per cent of the fields had more than the normal amount of iron in the nodes of the corn plants. Where fertilizers containing 7 or more per cent of potash had been used, only 14 per cent of the fields had corn with excessive iron in the nodes. Practically all of these were fields where extra nitrogen had been used in addition to the regular fertilizer.

In 1930 fertilizer demonstrations were started on four farms where the Hoffer stalk test had indicated that more potash was needed. Three fertilizer treatments were used: 1, fertilizer with 4 per cent potash; 2, fertilizer with 4 per cent potash and extra muriate of potash applied before corn was planted; 3, fertilizer with 10 per cent potash. The following table gives the results of these tests:

	Yields in pounds cut corn per acre with these fertilizer treatments		
Cooperator	4-8-4	4-8-4 & potash	4-6-10
S. W. Fuller, Albion, Maine	3,333	3,600	4,431
J. Fritz, Hartland, Me.	2,200	3,014	....
L. E. Libby, Hartland, Me.	2,929	4,156	3,480
H. B. Crouse, Dexter, Maine	2,756	3,156	3,068
Average	2,804	3,481	3,659
Value per acre	$84.12	$104.44	$109.78

All of the fields except that of Mr. Libby had had heavy applications of manure which probably explains why the plot which received the highest amount of potash gave the highest yield. The extra potash cost $5 per acre in the muriate of potash and $3.16 in the plot receiving the 4-6-10. After deducting the extra cost of the fertilizer the margin was $15.32 and

(*Turn to page 57*)

Onions fertilized with 500 lbs. of 4-8-6 per acre yielded a carload per acre on the farm of Millard F. Thomas near Henryetta, Oklahoma. This year Mr. Thomas is using a 4-8-10 fertilizer on 200 acres.

Knowledge Precedes Action

By L. J. McDonald

Agricultural Agent, Chamber of Commerce, Henryetta, Oklahoma

SOME communities get the cart before the horse. Such is not the case with the Henryetta Chamber of Commerce. This group of Oklahoma business men have promulgated the idea that knowledge must precede action.

It was some seven years ago that this industrial city decided that the agriculture of the district must keep pace with industrial growth; therefore, a man trained in scientific agriculture as well as the practical was employed as secretary. Although changes have occurred in the personnel of the office, men of like training have always been at the helm of agricultural development. The field demonstration method has been and now is the basis of all recommendations in furthering the agricultural development. Results chart the course to be followed.

Since the inauguration of this program there has been a marvelous transformation in the agriculture of the district. "King Cotton" has been dethroned, losing his enviable position as the only source of a cash income. Farmers have found that there are many other crops that have a cash value when harvested and supply the table with the necessities of life at the same time. This has been a distinct advantage to the business men, as the cash income of the farmers has been

distributed throughout the year. Strawberries, onions, grapes, Irish potatoes, sweet corn, and soybeans are the leading new cash and food crops being grown.

To grow the new crops is not sufficient. High yield per acre is the advice of the agricultural secretary. Demonstrations in the use of certified seed and commercial fertilizers are the order of the day. These have given uniformly successful and convincing results. These demonstrations have opened new avenues of income that were little dreamed of by farmers a few years ago. The farmers now demand a complete high analysis fertilizer such as 4-8-6 or 4-8-10.

Millard F. Thomas, prominent farmer, relates an interesting story that is typical of the district. "Seven years ago I was growing onions and irish potatoes and was fairly well satisfied with results. My onions produced a bumper crop when they made 150 bushels per acre. One hundred bushels of irish potatoes per acre were considered an excellent yield. I did not pay a great deal of attention to seed and never used any fertilizer.

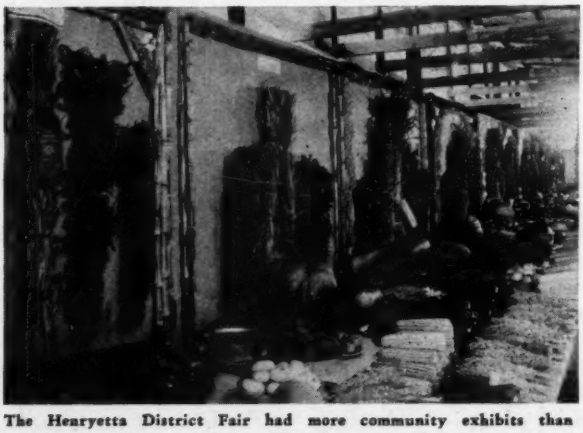
"In 1930 I harvested more than 450 bushels of No. 1 onions per acre and averaged 250 bushels of U. S. No. 1 potatoes on 40 acres. I attribute this increase in yield to using 500 pounds of 4-8-6 per acre on my onions and 400 pounds on my potatoes. This year I am using mostly 4-8-10 on my 200 acres of onions and will apply 500 pounds per acre. My potatoes will be from good seed and I will apply 500 pounds 4-8-10 on my best land. I expect to have over 100 acres in potatoes. I would not think of trying to grow a crop of onions or potatoes without using commercial fertilizer."

C. F. Young, who has farmed for the past 25 years near Henryetta, conducted an oat demonstration that proved conclusively that pure seed and fertilizer would greatly increase the yield. Certified seed plus 200 pounds of 4-8-6 yielded 55 bushels per acre as compared with a 25-bushel yield where common seed and no fertilizer were used.

Stress Soil Building

Soil building has kept pace with the commercial-fertilizer and pure-seed program. Corn alternated with cowpeas or soybeans has become a fixed practice on many farms. The soybean acreage received a great stimulus last year when an entire car of seed was shipped into the district. Approximately 5,000 acres of soys was the result.

Perhaps the greatest menace to soil fertility in Eastern Oklahoma is soil erosion. Thousands of tons of humus and plant food is washing away every year. In an effort to retard this great loss and to rebuild the soil fertility, a terracing program has been inaugurated.



The Henryetta District Fair had more community exhibits than any fair in Oklahoma in 1930. This shows 9 of the 15 agricultural exhibits.

Terracing demonstrations have been conducted throughout the district where farmers, school teachers, and 4-H club boys have been taught how to terrace the farms. Hundreds of acres have been terraced this year and indications are that the farmers of this

(*Turn to page* 60)

The Inquiring Mind *and the* Seeing Eye

By Dr. A. S. Alexander

University of Wisconsin

AGRICULTURAL educators, research workers, students, farmers, and a host of friends in many different walks of life, were shocked and saddened when a press dispatch brought the news that on March 23, 1931, Dr. L. H. Pammel, professor emeritus of botany at Iowa State College, had passed away. He died on the train, somewhere near Ogden, Utah, while in company with Mrs. Pammel, on the way home from spending the winter in California.

On March 26, he was laid to rest in the College cemetery at Ames, after an impressive service at St. John's Episcopal church where, for twenty years, he had been a senior warden and lay reader. Present at the service were Mrs. Pammel, her six children, and many sorrowing associates, students, and other friends.

The Ideal Scientist

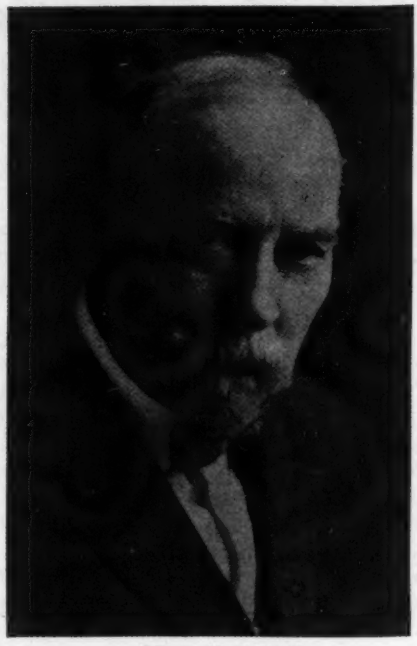
For more than forty years, Dr. Pammel had served in an enthusiastic and masterly way on the faculty of Iowa State College. His work was not only scientific in high degree but of great practical value to all who have to do with the conservation of the beauties and riches of Mother Earth, and the productions of her vegetable and animal kingdom. He had, withal, what Dr. O. H. Cessna, College Chaplain, termed, "A fine spirit of courtesy and an appreciation of things that make life worth while." His students loved him as a sincere sympathetic friend and wise counsellor who, on many occasions, acted kindly as a father *in absentia* when they were discouraged or perplexed.

Of him, President R. M. Hughes of Iowa State College said: "I have never known a man more enthusiastic about his own field or one who drove forward more persistently in the advancement of the causes to which he was devoted. In a very great number of ways he typified the ideal scientist."

Dean Charles F. Curtiss of the Iowa institution esteemed him as "a broad-minded, well-trained scientist, whose influence and service extended beyond the scope of his particular field —a man of far-sighted vision who served the State of Iowa in such an able manner that he leaves behind him an enduring record of deep conviction, worthy purpose, and high ideals in public service."

In his tribute, Dean Anson Marston testified that as an educator Dr. Pammel always emphasized effectively ideal motives, as contrasted with those of self interest, and was responsible, in a large way, for Iowa State College having one of the few strong herbaria in the Midwest. "Probably," he added, "the greatest gift to the State was his effort in the interest of conservation of the beautiful and historic spots in Iowa, as the first chairman of the State Board of Conservation. Dr. Pammel did these things in addition to building up a well-rounded department of botany."

It is interesting to note that Dr. Pammel was not only one of the most eminent botanists of his day, and especially in his intimate knowledge of poisonous plants, their effects upon farm animals, and methods of combating the pests and remedying their ill-effects, but a notable figure in the field of bacteriology. Dr. R. E. Buchanan, Dean of the Bacteriological Department at Ames, relates that in 1889 Dr. Pammel began teaching the subject to students of agriculture, science, veterinary medicine, and home economics, and continued the work during the following fifteen years. "He was one of the first, I believe the first," said Dr. Buchanan, "to teach bacteriology in a land-grant college, and one of the first to demonstrate in his research laboratories the causal relationship of bacteria to plant disease." This eminence in bacteriology, as well as botany, and all kindred subjects, indicates the keen interest Dr. Pammel took in many and diverse fields.



DR. L. H. PAMMEL

Dr. Louis Hermann Pammel was born at La Crosse, Wisconsin, April 19, 1862. His parents moved with him to a farm in State Road Coulee. There he spent his boyhood days, living in a log house, doing chores, and attending the local country schools. Later he studied in a business college and afterward took special instructions in history, languages, algebra, and other subjects, preparatory to entering the University of Wisconsin. There he received his Bachelor degree in agriculture in 1885 and his Master degree in 1889. In 1898, the degree of Doctor of Philosophy was conferred upon him by Washington University, St. Louis, Missouri. In 1925 the University of Wisconsin honored him with the degree of Doctor of Science in recognition of his notable research work relative to the cotton root rot and other important accomplishments.

After graduating, Dr. Pammel acted as private assistant to Dr. W. G. Farlow of Harvard University, from 1885 to 1886. Then he was assistant to Dr. William Trelease of Shaw School of Botany, St. Louis, 1886-1889, and spent the summer of the latter year in studying the root rot of cotton at the Texas Agricultural College Experiment Station. Later that year he became Professor of Botany in Iowa State College, and from 1892 he was botanist of the Iowa Agricultural Experiment Station. During 1900-1901 he studied forage conditions in Iowa, Nebraska, and Colorado for the Division of Agrostology and the Bureau of Forestry of the U. S. Department of Agriculture. Then he studied fungus diseases of Rocky Mountain trees, and the sheep grazing problem. Since 1908 he was collaborator of the U. S. Department of Agriculture, Bureau of Plant Industry, and in 1913 he was field agent for the Bureau of Plant Industry in cereal disease investigations.

Among his official positions of honor may be mentioned the following: President Botanical Society of America, Taxonomic Section, 1920-1929; Vice-president, Section G, American Association for Advancement of Science; President of Iowa Academy of Science, 1893 and 1923; President of Iowa Park and Forestry Association, 1905-1907; President Iowa State Board of Conservation, 1918-1927; Secretary General, Phi Kappa Phi, 1911-1923; President General, Phi Kappa Phi, 1923-1927; Member of Iowa Forestry Commission appointed by Governor Carroll to attend the Forestry Congress in Washington, D. C. He was also a member of the Board of Iowa Geological Survey, 1894 and 1923; American Society of Bacteriologists; Biological Society, Washington; Academy of Science, St. Louis; the British Ecological Society; and Deutsche Botanische Gesellschaft.

A Distinguished Author

Dr. Pammel was also well known as a voluminous and instructive writer. He published some 400 notable papers pertaining to various phases of botany, and delivered many lectures on like subjects. These publications and addresses covered a wide field, including education, morphology, biography, taxonomic botany, weeds, bacteriological subjects, plant pathology, ecology, and conservation. The veterinary profession was indebted to him for hundreds of instructive articles on poisoning of animals by noxious plants, published in various issues of *Veterinary Medicine*, and other journals, and for his *magnum opus*—"A manual of Poisonous Plants"—the standard textbook on the subject. Volume I, was published in 1910 and contained 150 pages, and Volume II, published in 1911, contained 977 pages in small print, and was profusely illustrated. The amount and variety of matter in these books is simply amazing, and the authenticity of their statement appealing. They evidence a prodigious amount of labor. Only a man of untiring energy could have produced them. The author consulted and quoted hundreds of authorities, at home and abroad. His colleague, Dr. R. E. Buchanan, contributed the section on the Schizomycetes, and Professor A. A. Bennett, the chapter on the active principles of plants. Some of the drawings were made by Dr. Pammel's daughter, Miss Lois.

Despite the vast amount of material contained in these books, its author modestly said in the preface to Volume I, "The work does not pretend to be complete. We hope, however, that it may prove useful to veterinarians, physicians, and laymen." That his hope was realized, the writer of this biography can certify, for the text is in use in agricultural institutions, the veterinary colleges, and the libraries of practising veterinarians and physicians throughout the land. Personally, we refer to it year after year, and each time are impressed with its scope, detail, and authoritative matter. If any struggling young producer of "another text-book" becomes discouraged with the writing of one or two-hundred thousand words, let him turn to Dr. Pammel's monumental tome and congratulate himself that his task is infinitesimal in comparison. The Manual is out of print, but its author purposed publishing a revised edition, a fresh demand for it having arisen.

Among other works written by Dr. Pammel were: Weeds of Farms and Gardens: Weed Flora of Iowa; Grasses of Iowa; Honey Plants of Iowa, with Miss C. M. King, and Prominent Men I Have Met.

The biographies written by Dr. Pammel in the last-named publication always will be treasured as of supreme interest. They gave deserved credit to eminent men who might, otherwise, have had little recorded recognition. The men so honored included: Professors J. L. Budd, Alfred R. Wallace, and Seaman Ashel Knapp, and Dr. William Trelease, Dr. William Stalker, Hon. James Wilson, Dr.

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A narcissus field in bloom in the Valley of the Mountain.

Narcissus Production *in the* Pacific Northwest

By H. D. Locklin

Horticulturist, Western Washington Experiment Station

DURING recent years, the production of flowering bulbs has become an important commercial horticultural industry in the United States. Although figures on total values are not available, according to the Bureau of Agricultural Economics of the U. S. Department of Agriculture, bulbs are being grown in practically every State. After six years of commercial growing, the production of the hardy narcissus in the Pacific Northwest is firmly established.

On January 1, 1926, the Federal Government placed an embargo on the importation of all narcissus bulbs to prevent the introduction of serious insects and diseases from foreign countries. Only a limited amount of planting stock was permitted entrance and this was allowed to come in only under special permit and then only when a supply of that variety was not available in the United States. Sixty-five to seventy-five million narcissus bulbs had been coming in annually from other countries. Since these bulbs could not be imported from the usual sources, they had to be grown within the country.

Growers in various parts of the United States started importing planting stock. The Paper White and other tender varieties were planted only in the Southern States. Plantings of the hardy narcissus or daffodils were made in several of the Middle Atlantic Coast States, in a few Northeastern States of the Mississippi Valley, and in the Pacific Northwest. Of all parts of the country, western Washington and western Oregon have been the most successful to date. This has been true because the climate and soil in this section are nearly ideal for the daffodil. The winters are mild, allowing abundant root growth. The springs are cool during the blooming season. Throughout April, May, and June, when the bulbs are sizing up, the weather is warm but not hot. By harvest time the air and soil are dry. The bulbs are partly cured when dug. The cool nights during July, August, and September prevent high temperatures in storage. This largely prevents basal rot. Northwest-grown bulbs ship and store well. The sandy loam, silt loam, and muck soils of this section of the United States have produced large sized bulbs of very good forcing quality.

Replace Importations

Practically all the planting stock in the United States originally came from Holland. For the four-year period preceding the application of the quarantine, the imports on all kinds of narcissus for the entire country increased from 77,193,281 bulbs in 1922 to 142,384,199 bulbs in 1925. Except during the last year of this period most of these bulbs were used in the usual trade channels and were not planted for commercial culture. The next four years (1926 to 1929 inclusive) the country imported a total of 69,531,375 bulbs or an average of over 17,000,000 bulbs per year. During this same four-year period, Washington alone imported 10,152,035 bulbs, or over one-seventh of all imports for that period. Oregon imported 1,949,659 for these four years. It should be remembered that all narcissus brought in after 1925 could be used for planting purposes only and had to be grown two years before being sold for commercial uses.

In the fall of 1930 there were approximately 325,000,000 narcissus bulbs in the United States. Of this number 130,000,000 were of the hardy narcissus or daffodil type. Washington planted 54,471,235* daffodils in 1930, or nearly one-half of this class in the country. Pierce county alone planted 33,640,839* daffodils last season. King, Whatcom, Cowlitz, Thurston, Clark, and Snohomish counties have large plantings. In Oregon most of the daffodils are grown in the Willamette Valley.

Narcissus are grown on various kinds

* Figures furnished by the Washington State Department of Agriculture.

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SPRING GLORY (Narcissus)

Southern Potato Profits

By G. C. McDermid

Charleston, South Carolina

POLITICAL observers always watch elections in Maine, for they say, "As Maine goes, so goes the Nation." But truck farmers are more interested in large yields per acre, than they are in elections. In many instances by careful observation and tests, farmers have shown that "As potash is increased, yields go up." Splendid proof of how potash increases yields is found in results from a test with potatoes carried out by Hal Hetzel, District Manager of the American Fruit Growers, Inc., on their Daniels Island (South Carolina) farm,

The table given below shows just why Mr. Hetzel was so pleased with the results he obtained:

All plots were one-half acre each and were fertilized on February 10 at the rate of 2,000 pounds per acre, the fertilizer being broadcast with a regular broadcast distributor. The soil was about as nearly uniform in all plots as was possible, with the exception of Plot 3, which contained a rather large deposit of oyster shells. The season, as a whole, was not favorable, to the South Carolina "trucking" belt. Very heavy, early rains, just after planting time, gave many farmers grave concern as to whether or not they would get a stand. A long, dry spell, lasting until digging time, followed this wet season. The soil

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	Plot No.	Fertilizer analysis (NPK)	Fertilizer per acre	Yield per acre (bu.)	Grade	Value per acre	Increase due to potash
1st Series	1	5-7-5	2,000 lbs.	93.6	US No. 1	$124.80	check
				45.6	US No. 2	30.40	plot
	2	5-7-7	2,000 lbs.	128.4	US No. 1	171.20	
				46.8	US No. 2	31.20	$47.20
	3	5-7-9	2,000 lbs.	112.8	US No. 1	150.40	
				66.0	US No. 2	44.00	$39.20
	4	5-7-11	2,000 lbs.	134.4	US No. 1	179.20	
				57.6	US No. 2	39.40	$63.40
2d Series	5	7-7-5	2,000 lbs.	97.2	US No. 1	129.60	check
				48.0	US No. 2	32.00	plot
	6	7-7-7	2,000 lbs.	129.6	US No. 1	172.80	
				69.6	US No. 2	46.40	$57.60
	7	7-7-9	2,000 lbs.	133.2	US No. 1	177.60	
				56.4	US No. 2	37.60	$53.60
	8	7-7-11	2,000 lbs.	147.6	US No. 1	196.80	
				54.0	US No. 2	36.00	$71.20

Stepping up the potash in the fertilizer increased the yields: (Left to right) 2-12-18 fertilizer, yield, 16.1 tons; 2-12-12, yield 14.8 tons; 2-12-6, yield 14 tons; 2-12-0, yield 12.2 tons.

Tomatoes *for* Canning

By E. R. Lancashire

Vegetable Specialist, Ohio State College of Agriculture

A TOMATO grower at Oak Harbor, Ohio, thoroughly convinced both himself and his neighbors that applying commercial fertilizers is a decidedly profitable practice. He had 2.88 acres of tomatoes planted and he put on 1,000 pounds of an 0-12-12 fertilizer at the rate of 600 pounds per acre. That part of the field which received the fertilizer produced 20 tons per acre; the part of the field which received no fertilizer produced 10 tons per acre.

The soil in this field was a very black silt loam. The average yield for the whole field was about 16.1 tons per acre. The 600 pounds of 0-12-12 used per acre cost approximately $10 and the increase of 10 tons of red ripe tomatoes produced on each acre which was fertilized sold for $110 leaving a profit of $100 per acre in favor of the fertilizer or about 1,000 per cent on the investment for a 150-day period. Figured as a banker would see it this farmer made 2,000 per cent on his $10 investment in fertilizer.

The use of commercial fertilizer pays maximum dividends only when the supply of organic material in the soil is satisfactory. When such a condition exists, the moisture capacity of the soil is usually sufficient to insure the optimum use of commercial fertilizer by the tomato crop. To obtain the full benefit of commercial fertilizer on the tomato crop, it is important first to build up the organic supply of the soil to a point where it will be able to make maximum use of such applications.

Sandy soils frequently are deficient

in both nitrogen and potash. All the soils in Ohio are deficient in available phosphoric acid except those that have been used for vegetable production for several years. Light colored soils are deficient in nitrogen unless they have had liberal applications of fertilizer and manure. Heavy applications of manure increase the nitrogen and potash content of all soils. Potash is frequently deficient in dark colored loams, silts, and clay loams which are well supplied with organic matter.

A minimum of 500 pounds of a well-balanced commercial fertilizer can profitaby be used on each acre of soil planted with tomatoes. Applications of more than 500 pounds per acre are recommended only when the grower knows through experience that it is practical for his particular field.

Time of Application

Since a complete fertilizer contains available nitrogen which is readily leached from the soil, it is best to apply such a fertilizer just before setting the plants. The most economical and satisfactory way to apply the fertilizer is with a grain drill. If satisfactory tools are available, hill or row applications (200 to 400 pounds per acre) of a complete fertilizer are often a profitable supplement to the broadcast applications. Potato plants with fertilizer attachments could be used to make row applications. Tomato transplanting machines equipped to apply fertilizer in the row are now on the market.

Fertilizers should be drilled in three to four inches deep so that they will be fixed in the soil at a depth where tomato roots are most abundant. Phosphoric acid and potash do not move up or down in the soil as readily as nitrogen does. Phosphoric acid and potash remain very nearly where they are placed and so it is desirable to work the fertilizer well down into the soil where the roots of the plants will be able to reach it.

The recommended fertilizer on light colored silt and clay loams is a 2-14-4 under Ohio conditions. When these soils have not been manured or built up with legume crops, the additional use of 100 to 200 pounds per acre of a nitrogen carrying fertilizer such as nitrate of soda or sulfate of ammonia is practical if the vines are light in color and dwarfed in size. This is applied as a top-dressing when the plants have set their first cluster of fruits. A one-row fertilizer drill can be used to put on this top-dressing, or the nitrogen fertilizer can be spread broadcast by hand on the surface of the soil.

The light colored sandy loams are fertilized with a 4-12-4 when used with manure or legumes. Two hundred pounds of sulfate of ammonia or nitrate of soda should be added as a top-dressing if the vines indicate that it is necessary. Light colored, slow growing foliage indicates a shortage of available nitrogen in the soil.

Dark colored loams, silt, and clay loams respond to an 0-14-6 or 0-12-12 fertilizer. The 0-12-12 gives good results on black soils. If the top growth is not dark enough in color and if the vines are growing slowly, a nitrogen top-dressing should be added.

Such recommendations as are made here are only for the purpose of establishing a working basis. Each grower would do well to test out fertilizers until he has one which suits his soil and crop rotation system best.

A grower can usually tell when a tomato plant needs additional nitrogen. If the plants are small in comparison with other plants of the same age or if the foliage is a yellowish green in color, it is more than likely that the supply of nitrogen is nearly exhausted. The plant which is starving for nitrogen produces very few and very small fruits.

Tomato plants growing on soils which are deficient in phosphoric acid are dwarfed in size. The foliage is a very dark green color. Phosphoric acid

A load of fine quality tomatoes on the way to the canning factory.

starvation symptoms are not as well known as are those for nitrogen.

Potash starvation symptoms have been worked out for several vegetable crops, including tomatoes. Tomato plants which are showing potash deficiency symptoms are of normal size. The most important way of identifying such plants is to examine the lower leaves. If very small spots appear along the veins and these later become so numerous as to cause the leaves to fall off, the grower may be fairly sure that lack of potash was the cause. These spots should not be confused with those of leaf-spot diseases.

The tomato crop will do well on a soil which has a pH value of 5.25 or higher. It is usually unnecessary to add lime for the benefit of the tomato crop except on extremely acid soils where the pH value is less than 5.25. The lime requirement of the legumes in rotation will therefore govern its use. To grow sweet clover or alfalfa requires a minimum pH value of about 6.5, with the optimum near pH 7.5. For red clover the pH should be at least 5.5, with the optimum pH between 6. and 6.5. Soybeans will do well on soil with a pH of 5.25 or higher. If fertilizer and lime are applied at the same time, they are likely to combine chemically, with a loss of availability and efficiency.

At Oak Harbor, Ohio, 66 farmers enrolled in the 1930 Ohio Tomato Club. These 66 men planted 243 acres of tomatoes. Each acre was fertilized with a minimum of 500 pounds of an 0-12-12 goods. The total tonnage produced was 2,224 tons or 9.15 tons per acre.

At Rockford and at Ohio City, Ohio, some 200 men secured an average yield of between 10 and 11 tons per acre. There were about 500 acres at these two places.

Celina and Mendon, Ohio, growers planted approximately 500 acres and averaged nearly 10 tons per acre. The 100 tomato growers at St. Henry, Ohio, produced an average yield of 10 tons per acre.

And so the production of 10 tons per acre in the case of tomatoes for canning is within the reach of any grower who is willing to do a good job of tomato growing. In the 1930 Ohio Tomato Club there were 203 men who produced between 10 and 15 tons per acre and 27 men secured yields between 15 and 20 tons per acre. Only one man was able to show a yield of 20 tons and over; Val Deitsch of Celina, Ohio, produced an average yield of 21.56 tons per acre on a 2.12-acre field.

The dark but not black colored silty loam soil on which the 21.56 tons per acre were produced was fertilized with 500 pounds of a 2-12-6 per acre drilled in broadcast just before the plants were set. In addition to this the plants were watched closely and a side-dressing of available nitrogen was applied at the first appearance of nitrogen starvation symptoms.

Growers Test Fertilizer

Mercer county is one of the most important tomato canning districts in Ohio. In this county, as in many other Ohio tomato districts, are to be found men who each year test out various kinds and amounts of commercial fertilizers in an effort to learn what analysis and what amount of commercial fertilizer should be used on their particular fields.

One of these men at Celina had a

very interesting demonstration of the value of fertilizer in securing an early and profitable first picking. On the 5.11-acre field where this test was made the average yield at the end of the 1930 season was 9.83 tons per acre. Four hundred pounds per acre of a 2-12-6 fertilizer were applied broadcast on all but four rows which were left unfertilized.

The results were convincing proof of the fact that fertilizer pays on tomatoes. The first picking on the four unfertilized rows yielded at the rate of .616 tons per acre, whereas the fertilized rows produced 2.01 tons per acre. The .616 tons of tomatoes sold for $6.77 while the 2.01 tons brought $22.11. The difference was $15.34 in favor of applying 400 pounds of an 0-12-6 per acre at a cost of $7.33. Here again the investment in fertilizer yielded at the rate of 2,000 per cent a year. This was one of those accidental fertilizer demonstrations brought into existence because the farmer ran out of fertilizer and did not get a new supply since the field was so nearly finished.

Another grower at St. Henry set out very definitely to find out just how many pounds of fertilizer he could profitably expect to apply per acre on his particular field for the canning tomato crop. He laid the field out in three plots. To one plot he applied 500 pounds per acre of a 2-12-6; to another 1,000 pounds per acre; and to a third 1,500 pounds per acre. The total numbers of crates produced per acre on each plot were 558 on the 500-pound plot, 566 crates on the 1,000-pound plot, and 532 crates on the 1,500-pound plot. So the profitable rate of application in this case was between 500 and 1,000 pounds per acre. The eight crates gained by using 1,000 pounds per acre in place of 500 pounds were sold for a little more than $2. The usual rate of application for canning tomatoes in Ohio is between 500 and 700 pounds per acre.

Then there were those who were interested in testing the value of potash on the tomato crop. The following table clearly shows that in the case of this particular demonstration the potash was a limiting factor:

Date Planted May 21, 1930
Date Harvested July-September

Plot No.	Fertilizer Treatment	Yields per Acre (tons)	Value per Acre @ $11	Cost of Fertilizer	Net gain for Potash
A.	1,000 lbs. 2-12-0	12.27	134.97	14.18	
B.	1,000 lbs. 2-12-6	14.00	154.00	17.48	15.73
C.	1,000 lbs. 2-12-12	14.90	163.90	20.75	22.36
D.	1,000 lbs. 2-12-18	16.09	176.99	24.05	32.15

Fertilizer Costs:—2-12-0=$28.35; 2-12-6=$34.95; 2-12-12=$41.50; 2-12-18=$48.10.

Crop Prices:—$11 per ton field run.

Remarks:—Irregular size of plots due to shape and location of the field and advantages of location favor the low potash plots.

The next demonstration showing the effect of potash especially on the speeding up of maturity of the tomato crop is worthy of attention:

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Miss Signe Holmer of Manistee was crowned Queen of the Festival by Fred W. Green, Governor of Michigan.

A Cherry Festival

By W. E. Fowle

Instructor of Agriculture, Traverse City, Michigan

IN the northern part of the lower peninsula of Michigan are two small peninsulas: Leelanau and Grand Traverse, protruding out in the blue waters of Lake Michigan. Nature has especially favored this region, making it possible to raise bountiful and superior crops of both the sweet and the sour cherry. The cool lake and bay breezes render the budding of the fruit trees an untold protection from damage of the spring frosts. These same breezes during the fall keep back the severe frosts, that come early to inland regions, and protect the trees until a blanket of snow has covered the roots of the young orchards.

By the middle of May these rolling hills, covered with cherry orchards, present a beautiful picture of trees in full white bloom. Honey-bees are constantly working on these millions of blossoms, lending music to the picture by their busy hum, and incidentally doing untold good by helping pollination for later fruit production. During this time of the season people come from far and near, making tours through the cherry region to observe its splendor. On a given Sunday during this blossoming time, services are held in one of the beautiful orchard

sites. This service, called "The Blessing of The Blossoms," was started six years ago by Mr. J. Smith and Rev. Wm. Chapman, two of Traverse City's citizens.

About six to eight weeks after blossoming time the earliest of the sweet varieties come into ripening, and within two or three weeks the full cherry harvest is on. Last year 30,000,000 pounds of cherries were brought into the six canning plants of the community. These cherries put into pies would represent a line of over 30,000,000 cherry pies, a solid line of pies way across our continent and losing itself through the Golden Gates into the Pacific Ocean.

Hold Festival in July

During the third week of July the celebration of the Cherry Harvest Festival is held. At this time more than a dozen communities join with Traverse City in its festivities. Organized orchard tours take the visitors into the very center of the fruit region, where they are allowed to get out and wander about the rolling orchards.

Later the large canning factories and plants are visited where the fruit is canned in tins by sanitary processes or by the fresh freezing processes by which they are preserved as fresh for consumption in later months. A farmer cooperative "made up of cherry farmers working with cherry farmers, for cherry farmers" is canning about 60 per cent of the cherries of the region. Last season witnessed the inauguration of this cooperative venture.

On the second day of the celebration a young lady is crowned as Cherry Queen. This honor was given last year to Signe Holmer of Manistee; the elaborate coronation, amid beautiful surroundings, being performed by Governor Fred W. Green of Michigan. During the day two elaborate parades with scores of floats moved up and down through the streets of the city and the National High School Band of the Interlocken Bowl supplied music. Among the activities of the day were motor boat races held on the beautiful Grand Traverse Bay.

In order to have such elaborate ceremonies, thorough community cooperative spirit, and yields of cherries, there must be some fine orchard work being carried on by the fruit growers on these two peninsulas. These orchards are producing high yields per tree.

Use Complete Fertilizers

In looking for the success of the cherry enterprise, one must turn his attention to the question of soil fertilization. The amount of experimental data on orchard fertilization is very limited. For a long time the adding of the nitrogen fertilizers was considered sufficient; however, today, many of the better orchards are being fertilized with complete com-

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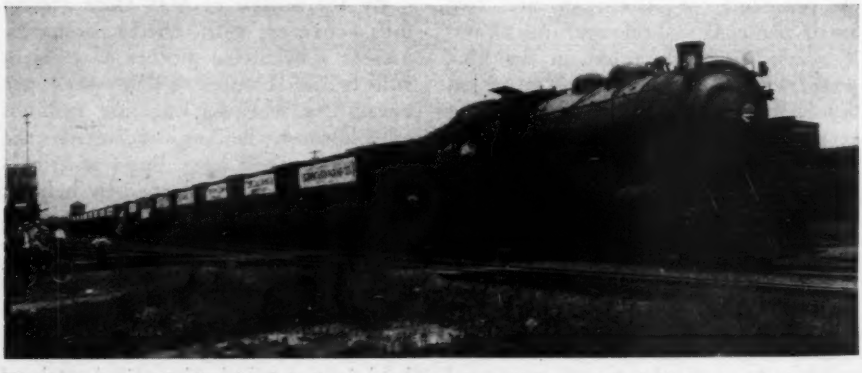

The Queen was at the throttle of the locomotive taking out the first trainload of cherries of the season.

Fertilizers *and* Disease Control

By A. L. Pierstorff

Plant Pathology Specialist, Ohio State University

PATHOLOGISTS and agronomists are realizing that one of the best ways of eliminating losses from diseases of some crops is by the application of more fertilizers, especially of certain elements like potash.

A striking case in point was demonstrated in Ohio last summer in the drought-stricken tobacco area. Illustration I shows plot A on the right which received no potash, but equal amounts of the other fertilizer elements. Plot B on the left received 128 pounds of potash in addition to the other elements. The yield of the plots and the price received per acre tell an interesting story. (See table.)

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Plot	Fertilizer treatment	Yield per acre pounds	Quality and price received		Value per acre	Fertilizer cost	Net gain
	400 lbs.	100	Yel.-Bright	12c	$12.00		
	0-20-0	392	Red	6c	23.52		
	400 lbs.	0	Lugs	..	.....		
A	4-10-0	256	Flying	4c	10.24		
		128	Tips	2c	2.56		
		172	Trash	7c	12.04		
			Total		$60.36	$12.16	
	400 lbs.	564	Yel.-Bright	16c	$90.24		
	0-20-20	344	Red	10c	34.40		
	400 lbs.	40	Lug	10c	4.00		
B	4-10-12	212	Flying	7c	14.84		
		20	Tips	2c	.40		
		168	Trash	10c	16.80		
			Total		$160.68	$20.15	$92.33

For Alfalfa

Apply Limestone Well in Advance of Seeding

By A. F. Gustafson

Extension Professor of Soil Technology, New York State College of Agriculture

SEVERAL years ago the writer visited a field of alfalfa in Tioga county, New York, one part of which was making excellent growth while the rest of the field was doing very poorly. Upon inquiry the owner stated that the entire field received the same treatment except lime. The soil growing the good alfalfa was treated with hydrated lime while that carrying the poor alfalfa was treated with limestone. The limes were used in quantities having approximately the same neutralizing power and both were applied but a few days before the alfalfa was seeded.

It is common knowledge now that hydrated lime acts very quickly in the soil. In fact hydrate, if intimately mixed with the soil, may do its work within a very few days. On this soil the hydrate had made conditions favorable for alfalfa and it grew well. Limestone, on the other hand, is comparatively slow in its action, and in this soil had not had sufficient time to make conditions suitable for alfalfa, with the result that the crop did not thrive. In fact limestone needs several months, after being thoroughly mixed with the soil, to do its work of correcting the unfavorable soil conditions usually referred to as soil acidity.

Recently it has been noted that alfalfa does better following cabbage than it does after some other crop on essentially the same soil, even though lime and phosphorus have been used at practically the same rate of application to the acre over the whole area seeded to alfalfa. On the cabbage land limestone was applied fully 12 or 15 months before seeding the alfalfa. On the area, not growing cabbage, however, the limestone was put on in the spring b e f o r e alfalfa was seeded. The difference in growth of alfalfa resulted from the fact

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The lime spreader puts the material on more uniformly than is possible by hand or with a manure spreader.

This picture was taken May 21, 1930. Left, 0-0-0 and lime, yield 1,474 lbs. dry matter; right, 1,000 lbs. 5-10-10 and lime, yield 2,578 lbs. dry matter.

Green Pastures *in* Ohio

By Earl Jones

Extension Specialist in Soils and Crops, Ohio State University

TEN permanent pasture improvement demonstrations, outlined according to the four-plot plan of the National Fertilizer Association, were carried on in northeastern Ohio in 1930. Nitrogenous fertilizers alone produced no benefit on three badly run-out pastures. There was a slight change in color, but the growth was only slightly increased and there was no increase in grazing. The complete fertilizer very noticeably brought blue grass back into the old run-out pastures. Timothy came in when the field had been mowed for hay in the last five years.

These demonstrations were placed on the farms of men who had already shown their interest in the proposition by doing some pasture improvement work at their own expense. The pastures selected varied from good to very poor condition. No other method of selection would be satisfactory since the condition of the permanent pastures of this section varies in this way.

The liming materials and mineral fertilizers were, with one exception, applied in the summer and fall of 1929. The nitrogenous fertilizers were spread the first week in April. The first clipping in the fenced area was made May 21 to 26 when the complete-fertilizer plot was in condition to furnish good pasture. The influence of the drought was beginning to be felt at this time, but the reduction in yield is not believed to have been large since the early growth started along well.

A hay harvest was made July 1 to

3. This is not reported since it cannot correctly represent pasture conditions. A second clipping was made at this time on only a few demonstrations, since the drought had noticeably reduced the growth. Later clippings were not attempted.

It was found that the recovery from the first clipping was extremely slow, because the early growth had been clipped too close. An effort will be made to more closely imitate grazing in making future clippings.

These results are not to be considered final. The poor condition of some of the pastures and the drought made the complete utilization of the lime and mineral fertilizers impossible, and it will probably be two or three years before their full effect is noted. The benefits of future applications of nitrogen will doubtless be greater than in 1930.

The uneven condition of some of the fenced plots made it difficult to secure typical samples. The fenced plots will be removed to more uniform areas that were closely grazed in 1930 with the hope that this lack of uniformity will be less serious in 1931.

The table gives a summary of the results as measured by the first clipping. Only eight demonstrations are included in the summary. The nitrogen was spread on the wrong plot in one case and the results of another were discarded because of the uneven growth on the extremely heavy soil. It was necessary for various reasons to discard certain plots on some of the demonstrations. No attempt has been made to figure profits at this time.

SUMMARY OF FIRST CLIPPING, MAY 21-26, 1930

An Average of Eight Pasture Improvement Demonstrations, Northeastern Ohio

	Dry Matter per Acre	Protein in Dry Matter	Protein per Acre
	Pounds	Per cent	Pounds
0-0-0	740.4	13.5	98.2
0-0-0 (Lime)	664.0	13.5	92.8
0-10-0	797.7	13.4	111.2
0-10-0 (Lime) ...	757.4	13.9	117.5
0-10-10 (Lime) ..	1074.1	13.5	152.5
5-10-10 (Lime) ..	2089.8	15.9	325.6

* Fertilizer applied at the rate of 1,000 lbs. per acre.

A common scene on pasture lands in northeastern Ohio, where the land is marked with potholes.

The difference in vigor of these plants was not due to fertilizer as no fertilizer was applied to this field. Source of stock was the answer in this case.

Better Peonies

By G. R. Cobb

Salisbury, Maryland

WITH the ever-increasing number of people growing bulbs and other outdoor blooming plants and the marked increase in acreage devoted to their culture has come an added desire for information relative to cultural directions, remedies, and preventives for diseases and insects, as well as definite information as to the kind and amount of fertilizer, if any, to apply.

During the extremely dry summer of 1930 there were many instances where peony plants wilted, turned brown, and dried up before their normal season for such signs of maturity. This premature browning and drying naturally caused much concern among growers, and many were the inquiries as to its cause. In some cases the growers attributed such browning to the use of fertilizer and in order to

This field received no fertilizer. All of the plants were treated alike and yet those on the left have turned brown and the tops are dying, while those on the right are still vigorous. The answer is different varieties.

ascertain, if possible, the cause or causes, an investigation was conducted among a large number of peony growers.

Realizing that peonies are moisture-loving plants, it was felt that some of this browning was due to the extremely dry weather, but not all of the injury could be attributed to the drought.

Cutting Weakens Plants

Another factor that contributed to the lack of vigor in the plants is the practice of cutting blooms to be sold as cut flowers. This is a very common practice in many of the Southern States as it adds a right nice income to the grower. But it weakens the plant so that there is a noticeable lack of vigor the following year.

Experimental work at Illinois showed that "peony plants from which the flowers had not been cut the preceding season averaged about 28 saleable blooms, while those from which all the flowers had been taken, leaving two leaves on each branch, produced about 14 flowers. Plants from which half the blooms were cut yielded about 21 flowers the second season. The report concludes with this statement, "So much foliage is lost in the removal of flowers that when the cutting is heavily done there is a marked decrease in the vigor of the plants the following season."

Further evidence of this is disclosed in the remark made by one of the workmen on a peony nursery when asked if the browning and drying up of the foliage meant that there was some disease present or any injury suffered by the plants. "No," he replied, "the plants always look like this late in the summer. You see we cut the flowers off in May and that weakens the plant so that they brown or dry up much earlier in the season." This man has been associated with peonies for nearly 15 years, so he should know something about their culture.

As the investigation proceeded, it was found that plants turned brown and dried up on fields that had received no fertilizer. Again it was clearly shown that no particular fertilizer or combination of fertilizers could be blamed for this apparent injury. The same browning was noticed in plants that had received applications of bone meal alone; a 3-8-5, 2-8-10, 4-8-10, etc., commercial mixtures. Thus the analyses were not the main factor nor was fertilizer apparently to blame.

Two other facts were brought out very forcibly in this investigation that showed that there are many contributing causes to this browning or premature ripening.

There is a vast difference in varieties as to the time of their maturity. Some varieties turn brown early in the season, comparatively speaking, while others retain their green color until late in the fall. This fact had not been observed by some of the growers, but when called to their attention they agreed that this was true.

Source of Stock Is Important

Also there is a wide difference in vigor between plants, that is stock, purchased from the Northern States and stock from the Southern States. This fact answered many of the inquiries relative to this early drying up of the foliage. In the Northern States the season is too short for any wholesale cutting of blooms for sale as cut flowers whereas in the Southern States many blooms are cut to catch the Decoration Day market for cut flowers. Recalling the facts disclosed by the Illinois Experiment Station it is evident, then, that stock from the Northern States should be more vigorous than that from the Southern States.

This reason for the early browning and drying was found in many cases, and as a result of the facts disclosed by the investigation, many growers will renew their "seed stock" by purchases from some of the Northern States.

(*Turn to page* 47)

SPRINGTIME IN ENGLAND — *Ewing Galloway, N. Y.*

PICTORIAL

Left: Ten minutes for repairs.

Right: Cleaning up a healthy appetite.

Right: Willing hands—
not wanted.

Left: A Sunday
morning job.

Left: This well sweep is still in use in Daviess county, Indiana.

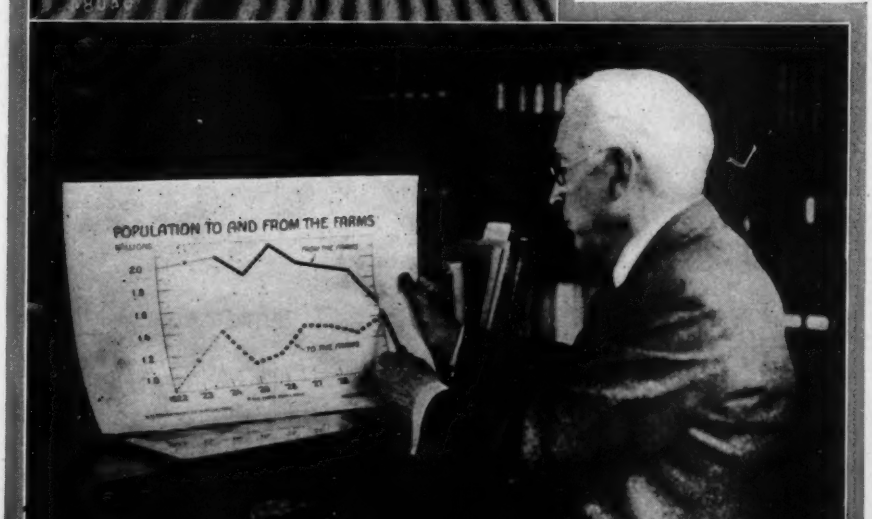
Below:
Henry W. Marshall, Tippecanoe county, Indiana, plants soybeans in the turning space at the end of the corn rows. The beans are later cut for hay or seed.

Right: A farm home in the Ozark Mountains.

Below:
Mr. and Mrs. John C. Hunt of New Baltimore, Ohio, found they had to lend a hand in caring for the five lambs born to one of their ewes.

Left:
Planting time, in one of the nurseries of the United States Forest Service in the West. The queer combination of shadows is caused by the lattice roof, which provides partial shade for tender young plants that would be hurt if exposed to the direct rays of the sun all day in mid-summer. The lattice roof will be removed in the fall.

Below:
Farm population in the United States made a gain for the first time in 10 years, according to Dr. C. J. Galpin, population expert of the U. S. Department of Agriculture, who is shown studying the chart he has prepared for the year 1930. The chart reveals that during 1930 almost as many people went back to the farms as left for cities. Although the farms lost 150,000 people during the year, the surplus of births over deaths gave a net increase of 200,000 people on farms during the year. The farm population on Jan. 1, 1931, was 27,430,000.



The Editors Talk

A World Congress

Periodically authorities critically and patiently look out over the world, analyze the causes for its depressions, and devise ways and means for curing them. For this purpose ninety-two National Agricultural Associations from twenty-seven countries will gather at Prague, Czechoslovakia, this summer to discuss world agricultural policies with a view to organizing agricultural production in different countries so as to equalize the supply with the demand for farm products. The occasion will be the Fifteenth International Congress of Agriculture, June 5-8, held under the auspices of the International Commission of Agriculture.

Professor Dr. Ing. Vlad. Brdlik, president of the organization committee, has asked the U. S. Department of Agriculture to bring the Congress to the attention of agricultural scientists and leaders in this country. The Department suggests in an announcement to the press that American agriculturists who may be traveling in Europe at the time of the Congress will find it to their advantage to include Prague in their itinerary. The Congresses are held every two years in different countries under the patronage of the Governments of the countries in which they are being held.

The program this year is separated into seven sections entitled: agrarian policies and rural economy; agricultural education and extension; agricultural cooperation; vegetable production; animal production; agricultural industries; and "the rural woman."

The section on agrarian policies and rural economy will consider the possibilities of organizing agricultural production in different countries with a view to bringing about an equilibrium between supply and demand of agricultural products, and the measure and means by which the expenses of production may be decreased. The importance and possibility of research on the formation and forecasting of agricultural prices will also be considered.

The section on agricultural education and extension will consider "services of agricultural consultations on an individual basis; methods employed and results obtained; and modern methods for promoting progress in rural districts by means of radio, motion pictures, agricultural expositions, and other agencies for making known the results of research." The section on agricultural cooperation will consider education in cooperation, the means employed, and results obtained. The section on vegetable production will consider national and international legal protection of new plant production, and the actual status of the question of inoculating the soil.

The section on animal production will consider heredity and its control in individual animals in order to improve their economic yield, and the possibilities of raising fur-bearing animals in connection with farming. The section on agricultural industries will consider methods and importance of the industrial utilization and conservation of potatoes and other vegetables. The mission of the woman in the struggle against the rural exodus will be the principal topic of the section on the rural woman. The feeding of the farm family by means

of products grown on the farm will also be considered by this section.

Undoubtedly nothing is more desirable or urgently needed at present than an equilibrium between production and consumption, but equally so there is nothing so difficult to accomplish. It therefore takes courage and vision to embark on what must prove to be a very stormy sea before anything like an equilibrium is accomplished.

We hope, however, that out of this Congress some tangible idea of practical world policies may develop. We wish the Congress every success.

Quality Stands the Test

Commenting on citrus shipments, the Florida Grower had the following to say:

"Heavy shipments in November resulted in declining market values. Both orange and grapefruit markets reached the point where only fruit of good quality and desirable sizes brought reasonable returns."

This condition of affairs was not unforeseen, for as far back as June, 1930, many competent observers pointed out that buyers always demand quality in years when the market is abundantly supplied. However, many growers figured that Mother Nature would be good to them and single-handed would produce a bountiful crop of large bright fruits with smooth texture and fine flavor. Now as never before these growers realize that faith without work applies in the citrus grove.

Mother Nature was kind as she usually is when man cooperates, but some growers in their zealous endeavor to cut costs practiced false economy. Last spring, for instance, many growers applied only nitrogen rather than the usual complete fertilizer. In spite of the fact that growth and bloom foretold a big crop, many growers cut down on their fertilizer per acre. Others went off at a tangent in this or that direction that may have seemed logical and cheaper at the time but failed to give results.

The chief complaints against Florida fruits this season were the usual ones during big crop years—small sizes and bad appearance. The appearance of the fruit, a very valuable sales asset, was poor due to neglect or ineffective spraying. With fertilizer applications per acre cut down, each tree got less, and when this was apportioned between the unusually heavy set of fruit, there was not enough "food per fruit" to form, develop, mature, and finish the heavy crop. The prevalent idea that trees and young fruits need largely nitrogen in the spring and can be later smoothed and finished with potash in the summer, like hogs allowed to run on pasture and later fattened on corn, has contributed much to the poor quality of this and other crops of fruit of past years. The young fruits need potash and phosphate when their cell structures are being formed. Quality goes further back than the young fruit; it may be greatly influenced and improved by growing the proper kind of fruiting wood the previous year—wood that has stored in it nourishment for the flowers and young fruits.

While many growers are reproaching the government, the railroads, marketing agencies, and everybody else that happens on the scene, there are others who are marketing a quality crop of fruit that is returning a reasonable profit in spite of the flood of low-grade, unclassified fruit on the markets. Very likely this latter group sprayed as usual and applied extra applications of high-grade fertilizers to support the trees under their heavy load, thereby pushing a large portion of their crop into a class that returned a profit.

Adjustments Possible

A long time ago a certain gentleman is reported to have taken other gentlemen to the seashore to prove to them that he could not influence the tides of the ocean.

In a more useful way it is being gradually proved that industry cannot influence, at least in a short time, the economic tides of the world. If it wants to reduce losses to a minimum or to make a profit in its own particular business, then one part of its job is to adjust itself to the incoming or outgoing economic tide.

V. B. Hart, Extension Professor of Farm Management, Cornell University, has aptly called it the "Handwriting On the Agricultural Wall" by which he means that there is a lot of information available about what farmers can expect in the future. He points out that "The writing on the wall is going to mean dollars and cents to farmers who read it and plan accordingly," and, that "there is certainly trouble ahead for the farmer who does not." And incidentally, there is trouble ahead for any industry which, on the basis of a manufactured optimism, disregards the plain handwriting on the wall.

The handwriting that Professor Hart calls particular attention to is:—

First: The country is in a period of generally declining prices.

Second: Indications are that we can expect the general price level of the country to return to at least a pre-war level during the next ten years.

Third: Labor will be relatively high.

Fourth: This means more fertilizer in order to save labor.

Fifth: Retail prices will be relatively high as compared with farm prices.

The meaning of this handwriting and its influence on the agriculture of New York State and the adjustments to be made by farmers are clearly discussed by Professor Hart in the Extension Service News, April, 1931, published by the New York State College of Agriculture, Cornell University. He concludes that New York State will continue to be more and more of a dairy State and still less concerned with the production of meat and wool.

Yes, the handwriting is on the wall. The successful man five to ten years from now will have read the handwriting and have made adjustments accordingly. Others will have been content with being merely optimistic and hopeful.

The How of Fertilizer Experiments

In planning experimental work with fertilizers "the check plots should not be left unfertilized; they should receive an application of fertilizer at least as large as the quantity the soil is capable of absorbing and holding in a condition unavailable to the growing crops," says W. J. Spillman, Principal Agricultural Economist, U. S. Department of Agriculture, in a recent issue of *Science*, dated February 20, 1931. And thus in the cause of progress, over many results of fertilizer experiments obtained by an orthodox technology of the past, there now hangs another cloud, for we suspect that fertilizer experiments have been patiently laid out and the experiments conducted for long years with check plots to which no fertilizer at all was ever applied.

And before the world took to changing so often and so suddenly, a lot of advice has been given in all sincerity in the belief that if there was no increase

in the crop yield, the fertilizer in question was not necessary, at least on that crop on that soil.

But this may not be so, for as the author points out, in some cases soils absorb small amounts of phosphate and nitrate fertilizers. Therefore the increase in yield due to increasing applications of such fertilizers does not appear to begin until the quantity applied exceeds the amount that can thus be absorbed.

By a mathematical study of the yields of oats, corn, and wheat grown on experimental plots at Snow Shoe, Pennsylvania, the author deduces that before any increase in the yield of oats was obtained from the use of phosphoric acid, "6.91 pounds per acre are absorbed by the soil and held in a condition unavailable to oats, the corresponding figure for corn being 7.55 pounds and for wheat 10.87 pounds." The method by which this probable soil absorption was determined from the crop yields of the different plots is explained.

Regarding potash, that certain soil types absorb and hold potash fertilizers unavailable to crops has been shown by Dr. E. L. Proebsting of the University of California in an interesting paper entitled "Absorption of Potassium Fertilizers by Peach and Prune Trees," published in the "Proceedings of the American Society for Horticultural Science," 1930. Referring to the point of possible absorption by the soil in one of the experiments, the author states, "The data seemed to favor the idea that most of the potassium has been fixed in the top soil and that little or none was taken in by the trees;" in this case referring to the results of the experiment on prune trees only.

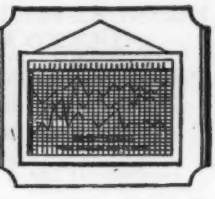
Thus the work of accurately planning and interpreting field experiments with fertilizers becomes more complicated; there is a field of problems yet to be solved. But while the technical questions involved are being threshed out by the experts, at least the plain and simple idea can be understood, namely, that in the case of some fertilizer materials there is a state of competition between the soil and the crop to get the fertilizer material applied to the soil. If the soil succeeds, the crop gets less or none. Therefore a caution and a precaution seem to be both necessary—caution in interpreting the results of fertilizer experiments, especially when no increase in yield is obtained from small amounts of fertilizer per acre, and the precaution to use enough fertilizer materials properly applied in experimental work to permit of possible fixation by the soil.

STRANGE is our situation here upon earth. Each of us comes for a short visit, not knowing why, yet sometimes seeming to divine a purpose.

From the standpoint of daily life, however, there is one thing we do know: that man is here for the sake of other men—above all for those upon whose smile and well-being our own happiness depends, and also for the countless unknown souls with whose fate we are connected by a bond of sympathy. Many times a day I realize how much my own outer and inner life is built upon the labors of my fellow men, both living and dead, and how earnestly I must exert myself in order to give in return as much as I have received. My peace of mind is often troubled by the depressing sense that I have borrowed too heavily from the work of other men.

—ALBERT EINSTEIN.

AGRICULTURAL DEVELOPMENTS



IMPROVED CONDITIONS EXPECTED

Dr. G. F. Warren, widely known economist of the New York State College of Agriculture, expects the automobile and clothing industries to show the first improvement. Real estate, he says, will need about five years to adjust itself to the new low values. He does not predict a return to 1929 prices. The new low price level finds cotton, wheat, barley and eggs priced too low, and he predicts that they will rise in price. Potatoes, however, are now 44 per cent above pre-war and cannot be expected to maintain this high price for the next five years. Some sections of New York State have not experienced a depression, particularly the southeastern part. If they have had a depression, other sections of the country have experienced a calamity. They have been close to market and have avoided the high distribution costs which, Dr. Warren says, must be adjusted.

LACK OF POTASSIUM MAKES SUGAR CANE SICK

Just as men or animals will sicken if they do not get enough salt, so do plants become ill and stunted if they are starved of one or another of the mineral nutrients they need. Experiments performed at the University of Chicago by Dr. Constance Hartt of St. Lawrence University, of Canton, N. Y., show that sugar cane must have its modicum of potassium in order to remain healthy.

Deprived altogether of potassium, the cane plants suffered from decreased growth, dieback, and deficient development of their all-important green coloring matter.

With a little potassium they showed a little growth; with more, better growth; there was a definite correlation between the amount of the mineral supplied and the amount of plant material produced. The only plant part that grew faster on short potassium ration was the root system, and this growth was only in length, as though in search for the missing element; there was no increase in weight even in the roots.

There were internal abnormalities also in the cane plants on a potassium-starvation diet, expressing themselves both in unusual structural elements and in off-key physiological behavior. —Science News Letter, March 7, 1931.

ILLINOIS MAKES SURVEY OF WHEAT GROWING COSTS

It costs about 93 cents a bushel to grow wheat in the St. Louis wheat and dairy area, according to cost figures gathered by the Illinois College of Agriculture. Land in this area, according to the announcement, is valued at about $80 an acre and it takes approximately 12 man hours and 24 horse hours to grow an acre of wheat. Allowing 18 cents an hour for man labor and 9 cents an hour for horse labor, and adding these to the other items of expense, an acre of wheat producing 18 bushels costs $16.75 in the St. Louis area.

In east central Illinois where land varies in value from $125 to $175 an acre, it costs about 88 cents a bushel to grow wheat, according to figures kept by a group of farmers for the college.—*Marketing Activities, March* 4, 1931.

USE MORE FERTILIZER ON REDUCED ACREAGE

Proper Fertilization Will More Than Double Labor Efficiency, Says C. B. Williams

Despite all the harsh words directed at them, cotton and tobacco are still the two chief money crops of North Carolina farmers. The thinking farmer does not forget that five-sixths of the annual production value in North Carolina comes from crops and about two-thirds of this comes from the main cash crops of cotton and tobacco.

"This does not mean that other crops should not be grown and that they do not make farming a safer and more profitable business," says C. B. Williams, head of the agronomy department, North Carolina State College of Agriculture and Engineering. "But as our farming is now conducted we must face facts and realize that the prosperity of our farmers and of a large group of persons depending on the farmers' income is affected by what happens to cotton and tobacco."

More Attention to Reduced Acreage

Mr. Williams fears that because of poor business conditions, many growers this year will seek to do away with some of the practices that tend to make good acre yields. Some growers will even increase their acreage to cotton and tobacco and depend on acreage rather than intensive cultivation to pay a profit. This is all wrong, he says. It were better to cut sharply the acreage of cotton and tobacco and to put more intensive effort on the reduced acreage.

Fertilizers, he says, usually return from two to three dollars profit for every dollar expended when used with cotton and tobacco and the right amounts and kinds should be used again this year despite the depression. On coastal plain soils, the efficiency of labor in growing cotton is increased 2.37 times by the use of fertilizers and 2.84 times in the piedmont section. More pronounced results are secured with tobacco. It is poor economy to cut out fertilizers this year, he declares.

LAWN NEEDS SPRING TONIC TO HELP OVERCOME WEEDS

A good way to fight weeds in the lawn is to feed them. This is the seemingly paradoxical advice of turf specialists of the United States Department of Agriculture. Feeding the weeds gets results, the experts say, because the fertilizer that feeds the weeds also feeds the grass and stimulates such vigorous growth that the grass, which thrives with frequent cutting, will run out the objectionable weeds.

For lawn fertilizer, the specialists say, it is hard to beat well-rotted manure. For the spring dressing it is a good plan to compost manure with leaf mold and sod or other vegetable wastes, and then sift in with a coarse screen to remove lumps and bunches. A top-dressing is a spring tonic for a lawn. In the fall it is not so necessary to compost manure or to remove lumps and undecayed matter.

The forage men advise an application of 4 or 5 pounds of either the muriate or the sulphate of potash and 10 to 15 pounds of superphosphate for each 1,000 square feet of lawn. This should be repeated every two or three years.

A good nitrogen fertilizer for early spring is composed of cottonseed meal and either nitrate of soda or sulphate of ammonia. Use 4 or 5 pounds of the meal to each pound of the concentrated fertilizer, and scatter the mixture over the lawn at the rate of about 15 to 20 pounds to each 1,000 square feet.

We can understand why a fool and his money are soon parted, but where he gets it is what gets us.

Green Manuring in Germany

By H. R. Cox

Extension Agronomist, New Jersey Experiment Station

THE areas in Germany where green manuring is most extensively practiced are to the east and northeast. Most of the people interviewed by the writer on this subject were located in the Province of Brandenburg, of which Berlin is the center. These remarks probably apply, however, with a fair degree of accuracy to all the other provinces in which green manures are grown.

The soils of eastern and northeastern Germany are predominantly sandy. Furthermore, the season is comparatively short and the rainfall none too abundant, with frequent droughts in midsummer. It is not a grass country, therefore, and is at a disadvantage in livestock production. The shortage of manure is one of the reasons why attention was directed years ago to green manures as a means of maintaining the organic matter content of soils. It must be understood that the liberal use of commercial fertilizer is an essential feature in utilizing green manures successfully.

It is noteworthy that green manures are grown only in those districts where extensive rather than intensive farming is practiced. The crops grown, other than green manures, are principally potatoes, roots, small grains, and forage. Excepting for certain vegetable crops grown on a field scale, notably potatoes and cabbage, the vegetable industry of Germany is confined very largely to intensive market garden farms on which stable manure is relied upon to maintain the organic matter.

The outstanding crops used in green manuring are lupines and serradella. Both are frequently raised for their seed, however, in which case

This German farmer is standing in a crop of serradella growing in rye stubble in August.

they cannot be considered any more of a green manure than a seed crop of soybeans would be with us.

There are two kinds of lupines in Germany, the yellow and the blue. The latter will not tolerate as high a degree of acidity as the former. In fact yellow lupines seem actually to prefer a rather high degree of soil acidity. It is the yellow kind that is largely used for green manuring.

Occasionally the yellow lupine is seeded in early spring to occupy a large part of the growing season. This is considered a wasteful use of the land and is practised only where land is poor and its value low. A much more common way of using lupines is to sow them, alone or in mixtures, in summer after a grain crop has been harvested. The seed is often sown on the stubble and plowed down shallow. The crop is turned under in the late fall or the following spring. Since the rate of sowing is heavy, about 200 pounds to the acre, and since the seed is in demand for feeding purposes, the seed cost is fairly high, a fact which probably prevents the more extensive use of lupines as a green manure.

The Serradella Plan

Where used as green manure, a serradella crop is usually sown in early spring in standing winter rye. Seeding is done preferably when the soil is moist, and the seed is usually harrowed in. The crop is allowed to grow during the summer and fall following the grain harvest and is plowed down in the late fall of the following spring. Thus it is used as a companion green manure crop in much the same way as sweet clover in parts of our Midwestern States. Serradella has the advantage of being quite tolerant of unfavorable soil conditions. This scheme of using serradella is preferred, therefore, on the poorer and lighter soils to the sowing of lupines after grain harvest, as described above.

The serradella plan, however, has certain disadvantages. In the first place the field is apt to become more or less weedy after grain harvest, and serradella is not preeminently fitted to fight weeds. The German farmer has apparently a more pronounced aversion to weeds than have our own farmers, so that this is to the German a weakness of the serradella scheme. Further, a period of drought in midsummer after grain harvest is apt to be damaging to the stand and growth of serradella. This was the case in 1930 when the unusually dry weather of June and July greatly reduced the stand. In spite of these disadvantages, serradella may be used in this way as a companion green manure crop at comparatively low cost for seed and labor. The plan will probably persist to a greater extent than will the lupine scheme.

Other Crops Used

There are certain other crops that are used to a lesser extent as green manures. Like the two previously discussed, they are generally made to occupy the summer and fall season after grain harvest. One of these is black medic (Medicago lupulina). This crop is used in the same way as serradella, as a companion crop; but it has pronounced soil requirements, tolerating only a slight degree of acidity, so that its use is confined to the better and heavier soils of low acidity. Other crops occasionally used as green manures include field peas, beans, the cereals, sweet clover, and vetch, both hairy vetch and spring vetch. Hairy vetch is feared as a weed in small grains, which greatly limits its use. Sweet clover is reported as being grown in some parts of Silesia, seeded either in winter grain or after grain harvest.

There is considerable variation in the rotations involving green manures. Often two or more rotations are used on a farm. The German farmer has an intelligent understanding of the quality of his soil and makes a conscious effort to adapt the various sections of his farm to the most favor-

(*Turn to page 56*)

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

"Phosphate Deficiency in the Soils of Montana," Agr. Exp. Sta., Bozeman, Mont., Bul. 240, *Jan.*, 1931, *Iver J. Nygard.*

Soils

"Soil Management for Apple Orchards," State College of Agr., Raleigh, N. C., Ext. Cir. 184, *Mar.*, 1931, *H. R. Niswonger.*

Crops

An addition to the data accumulated on the use of complete fertilizers in orchards is to be found in Bulletin 241, "A Study of Apple Tree Growth," by Edmund Burke, H. E. Morris, and F. M. Harrington of the Agricultural Experiment Station at Bozeman, Mont. The experiments reported were started in 1914 and while the results have shown that a nitrate fertilizer gave the most marked improvement, the trees showing winter injury at the time of applying fertilizers recovered more quickly where a complete fertilizer was used. The experimenters found that although the limiting factor in these Montana soils was nitrogen, the results with complete fertilizer further indicated that in some cases when nitrogen was supplied, phosphorus and possible potash became limiting factors. As a result of the experiments the Montana station is recommending: "When the soil is low in organic matter at the beginning of the building-up process and the trees are young, 2 pounds of nitrate of soda should be added to the soil around each tree early in the spring. If the trees are of fair size and bearing, from 6 to 10 pounds of complete fertilizer, 10-6-4, should be added to each tree early in the spring. Where trees are making a fair growth, a 6-10-4 fertilizer can be used instead of the 10-6-4. The 6-10-4 fertilizer is the one to use after the first year's treatment with a 10-6-4 fertilizer. There are growth and fruiting habits, however, which have a bearing upon the foregoing recommendations."

"Tenth Annual Report, Period Ending Dec. 31, 1929," *Calif. Dept. of Agr., Sacramento, Calif., Monthly Bul.* 12, *Vol. XVIII.*

"Blackberries and Dewberries," Agr. Exp. Sta., Gainesville, Fla., Press Bul. 427, *Jan.*, 1931, *Harold Mowry.*

"Corn Growing in Michigan," Agr. Exp. Sta., East Lansing, Mich., Spec. Bul. 210, *Jan.*, 1931, *H. C. Rather and J. R. Duncan.*

"The Quarterly Bulletin," Agr. Exp. Sta., East Lansing, Mich., Vol. XIII, No. 3, *Feb.*, 1931.

"Lodging in Oats and Wheat," Agr. Exp. Sta., Wooster, Ohio, Bul. 471, *Feb.*, 1931, *F. A. Welton and V. H. Morris.*

"Bloom Period and Yield of Apples," Agr. Exp. Sta., Wooster, Ohio, Bul. 472, *Feb.*, 1931, *C. W. Ellenwood.*

"Oats in the Northeastern States," U. S. D. A., Washington, D. C., Farmers' Bul. 1659, *Mar.*, 1931, *T. R. Stanton and F. A. Coffman.*
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19 PER CENT OF WORLD'S FERTILIZER USED IN U. S.

The United States, with about 6 per cent of the world's population, used approximately 19 per cent of the world's annual output of commercial fertilizer and ranks second only to Germany as a consumer.

P. E. Howard, chemical engineer of the fertilizer and fixed-nitrogen investigations unit of the Bureau of Chemistry and Soils, United States Department of Agriculture, estimates the world's annual production to be worth $592,235,000. Mr. Howard bases his estimate on assumed values of $160 a ton for nitrogen in the warehouses of the producer, and a value of $50 a ton each for phosphoric acid and potash. Such figures are only approximate, however, because unit values of fertilizer vary over a wide range, he says.

The manufacturer of more highly concentrated fertilizers and their increasing use, are the most outstanding recent developments in the fertilizer field, according to Mr. Howard, who points out that the total amount of plant food used by American farmers increased 45 per cent from 1914 to 1928 and the amount of plant food in the average fertilizer increased from 12 or 13 per cent in 1914 to 17 per cent in 1928. Today the farmers of the United States are using fertilizer with nitrogen content increased 100 per cent, with an increase of 40 per cent in potash and 16 per cent in phosphoric acid.

High Potash Fertilizers Make Southern Sweets Profitable

Baldwin county, Alabama, has been famous for its Green "Sweets" for June and July shipments. Recently, efforts have been made to get a superior variety introduced. After failure in the county, due to improper fertilization and lack of disease-free stock, Tom Mitchell of Foley, Alabama, set out in 1930 to demonstrate that the Big Stem Jersey variety could be profitably grown in Baldwin county.

After Mitchell secured disease-free seed stock, he then gave thought to the matter of correct fertilization and concluded that he should use from 1,000 to 1,500 pounds per acre of 4-8-15 (NPK). His results were so encouraging that he was induced by his fellow growers to produce 2,000 bushels of certified seed stock for planting in 1931. Ten acres of vine cuttings were planted the last week in July and fertilized with 1,200 pounds of 4-8-15.

Mr. Mitchell had very unfavorable weather on the potatoes due to so much rainfall, as shown by the official weather report for Silver Hill (9 miles from Foley) which is given below:

Month	*No. days rained*	*Total rainfall*	*Precipitation High*	*Low*
Sept. . . .	15	8.56	1.51	.2
Oct. . . .	9	4.43	2.65	.12
Nov. . . .	8	6.90	3.15	.3

It will be seen that during the three growing months it rained 32 days with a total rainfall of practically 20 inches varying .12 of an inch which was the lightest rain to 3.15 inches, the heaviest.

During the flood period in November just before the potatoes were dug, water completely covered a part of Mr. Mitchell's field and some places were submerged for nearly a week. Yet, when dry enough to dig, not one potato was rotten. Mr. Mitchell attributes this almost unbelievable fact to the fertilizer analysis, as all of his neighbors' potatoes, fertilized with the old standard fertilizer, 4-10-7, rotted in the field.

His crop was not damaged in the least by the rainfall, and from these late plantings 200 bushels of certified sweets per acre were produced. Mr. Mitchell is the only man in that section who has seed potatoes for sale and says the high potash saved his crop.

In 1931 Mitchell and all other growers who will plant this variety will use high-potash analysis fertilizer, generally 4-8-15.—T. W. Allen, Troy, Alabama.

Better Peonies

(*From page* 30)

In summing up the reasons for the early browning and drying of peony foliage, they might be listed thus in the order of their importance: source of stock; lack of moisture; heavy cutting of blooms; forced growth so that stalks are very succulent; and planting too deeply. In no case during the investigation could there be found any instance where fertilizer was definitely blamed for the apparent injury to the plants.

—AND SO WE SHOT HIM!

Alkali Ike: "What's happened to the tenderfoot stranger wot was here last week?"

Texas Pete: "Poor feller. The second mornin' he was here he wus brushin' his teeth with some of that foamy tooth paste and one of the boys thought he had hydrophoby an' shot him."

Potash Paid in Ohio

By Rensselaer Sill

Ohio State University

PRODUCING a 20-bushel increase in wheat yields and a boost in alfalfa hay production of 2,938 pounds per acre, an 0-20-10 fertilizer applied at the rate of 350 pounds per acre was shown to be of considerable value in a series of demonstrations conducted this summer in Ohio by D. P. Miller, county agent for Darke county, and D. D. DuBois of Neave township.

Plots not treated with fertilizer produced 25.95 bushels of wheat per acre, an 0-20-0 fertilizer produced 31.67 bushels, an 0-20-10 made 45.82 bushels, and an 0-20-20 fertilizer raised the yield to 40.93 bushels. The alfalfa yields were also increased by applications of fertilizer. The untreated plots yielded 6,980 pounds of hay per acre, the plots treated with 0-20-0 produced 8,925 pounds, the 0-20-10 made 9,523 pounds, and 0-20-20 fertilizer yielded 9,918 pounds.

All the fertilizer was applied at the rate of 350 pounds to the acre and four quarter-acre plots were used in the demonstration which was started, according to County Agent Miller, in September, 1928. The soils in the tests were uniform and the yields were carefully measured.

In speaking of the demonstration, Miller states that for $4.92 worth of 0-20-0 Mr. DuBois received 5½ bushels of wheat and 1,945 pounds of alfalfa hay per acre; for $7.14 worth of 0-20-10 he received 20 bushels of wheat and 2,543 pounds of alfalfa hay; and for $9.30 of 0-20-20 he obtained 15 bushels of wheat and 1½ tons of alfalfa hay. The extra profit paid by fertilizing may be seen by multiplying by 10 the yields obtained on one acre with say an 0-20-10. Then for $71.40 worth of fertilizer the yields would be increased by 200 bushels of wheat and 13 tons of alfalfa hay on 10 acres.

New Life for Flower Beds

By R. B. Hull

Extension Department, Purdue University

NO matter how beautiful an arrangement of perennials you may have in your garden, they finally reach an age at which a rapid decline in vitality may be expected. When that stage has been reached, it is usually the better plan to give the entire bed a thorough renovation. It is very difficult to do a good job of working in compost and commercial fertilizer on an old bed. A top-dressing of compost forked in between such plants encourages them to form a shallow root system which is always a great disadvantage especially during hot, dry weather. On the other hand, it is not difficult or costly to spade up the best plants, with a good supply of dirt about the roots, and lay them out in an open space for a few hours. This opens up the entire bed, and a liberal supply of compost can be quickly and thoroughly forked deeply into the soil. At the same time work in 20 to 25 pounds of one of the high-grade "complete" fertilizers to each 1,000 square

feet. Old plants will put on new vigor in their new homes and repay you with twice their former crop of blooms.

This practice has another point strongly in its favor and that is that the plants which are to be saved and put back in the new bed can be given room in proportion to the present size of their crowns. Most perennial beds are planted too close to begin with, and after a few years it is difficult to cultivate between the plants and there is a disastrous competition for adequate supplies of food and water. Tufts of blue grass also become firmly established in such a manner that it is almost impossible to remove them except by an occasional renovation.

If the bed is to be enlarged, or some of the old varieties discarded in favor of new ones, it is still possible to make the entire area appear like an old, well-established planting. This can be done by giving the new plants ample room and using an interplanting such as Canterbury Bells in the more open spaces. Well-rooted plants in many colors are always available and they have few equals for flowering effects the first season. Canterbury Bells are biennials and most of them will die out after blooming. This leaves plenty of room for the young but permanent varieties to expand. Perhaps a real spring housecleaning for at least one room of the flower garden would bring a new lease on life to some of your oldest and dearest friends.

Know and Grow Alfalfa

By J. R. Beck

County Agent, Polk County, Dallas, Oregon

QUEEN alfalfa continues to find her niche in the farming operations of district after district where a few years ago her production was considered impractical. Way out in the Willamette valley of western Oregon where the cooling breeze from the Pacific Ocean tempers the climate, Grimm alfalfa has increased by leaps and bounds since 1923 until now it is grown by hundreds of farmers.

Yet, there are more hundreds that have not been persuaded of the advantages in the production of this wonderful legume. C. W. Irvine of the Farmers' State Bank of Independence realized this condition and arranged two contests for the people of Polk county in which his bank is located. The first one was for the school children to get them interested in talking alfalfa at home. This was a slogan contest, and 69 boys and girls sent in slogans with stories substantiating them. "Know and Grow Alfalfa" by Bernice Blodgett of Monmouth was awarded first prize and $25.00 in cash. Cash prizes were also paid to second and third places.

The second contest announced by Mr. Irvine is to be judged in June, 1931, at which time an alfalfa cultivator will be awarded to the farmer who has the finest field of alfalfa seeded in 1930.

As a result of these two contests, and of the previous two years' two silver trophy contests staged by the Dallas Chamber of Commerce, more than 14,000 pounds of alfalfa seed were planted in May and June, 1930. This was enough to seed 1,200 acres, which is greater than the total acreage seeded prior to that time in the entire county.

The Farmers' State Bank is in a typical dairy community, and Mr. Irvine is a thorough believer in feeding the products of the farm on the farm.

A Cherry Festival

(*From page* 24)

mercial fertilizers.

It seems to be apparent that a quantity of potash must be put into the fertilizers to make high production in the orchards permanent. There seems to be no question that the addition of potash in orchards where high production is being sought influences wood growth and helps fruit production to a great extent. Commercial fertilizers such as 10-6-4 and 7-8-5 are now being used in many of the orchards. Many orchardists who are using this practice are beginning to see that the procedure is the right one to maintain good soil and yields.

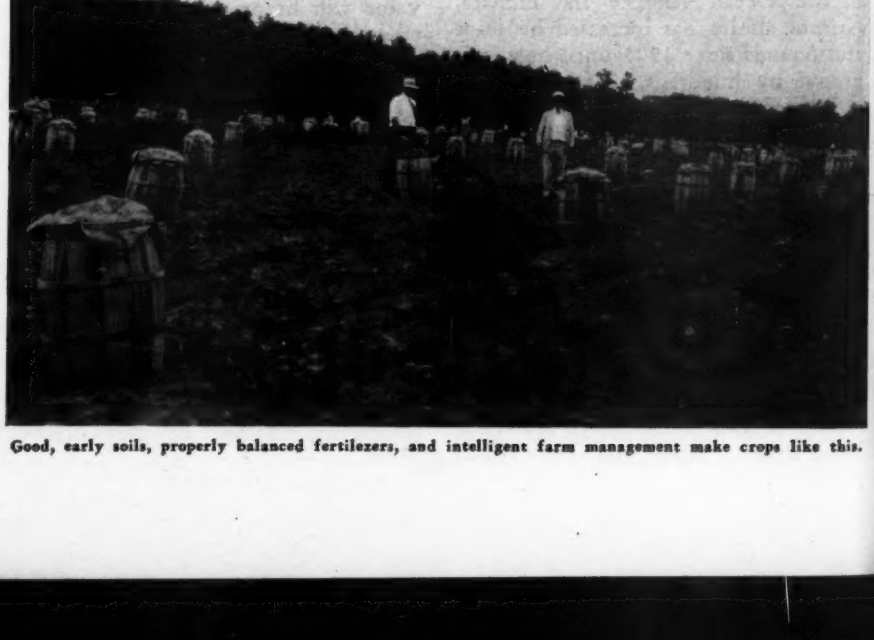
Mr. Julius Chapin, prominent grower on the Leelanau peninsula, has made a very thorough study of orchard practices in his region. I am quoting him in saying that 32 per cent of the producers are using a complete commercial fertilizer, containing nitrogen, phosphoric acid, and potash. From his observations about 52 per cent of the farmers are depending on minerals as their supply of plant food elements. The others maintain fertility by using barnyard manure or cover crops which are plowed under in the spring.

Southern Potato Profits

(*From page* 18)

caked in the hot Southern sun, and it was only by the use of extreme care in cultivation that the crop grew as it did. The yields, while in line with the 1930 crop, were below the average yields of normal years for the Charleston area.

Probably the most outstanding feature of the tests was the comparison of the two series—the nitrogen remaining at 5 per cent in the first series and being increased to 7 per cent in the second series, with the potash going up two units at a time in each case. Comparing corresponding plots in series one and two, nitrogen shows comparatively little effect in raising the yields, while the additional potash



Good, early soils, properly balanced fertilezers, and intelligent farm management make crops like this.

in every case gave large increases over the checks.

As was mentioned, a rather large deposit of oyster shell was found in Plot 3. This shell was evidently deposited by the Indians or by some of the pioneer settlers of the Island, and much of it had disintegrated, and was broken into tiny particles. The presence of this "lime" in the soil had much to do with the decrease in No. 1 potatoes found in the plot and the appearance of considerable "common scab" on the tubers.

This series of tests, along with hundreds of others on potatoes and other truck crops, carried on in many parts of the United States, has helped pile up proof that potash in considerably larger doses than have been used is not only essential but is necessary if farmers are to stay in the highly competitive game of "trucking."

The Inquiring Mind

(*From page* 15)

Asa Gray, Hon. William Miller Beardshear, Dr. T. E. L. Beal, Dr. H. J. Detmers, Rev. LeRoy Titus Weeks, Dr. Charles Cleveland Nutting, E. W. D. Holway, and Spencer Ambrose Beach.

A report of Dr. Pammel's activities from December to October, 1930, shows the strenuous life he led and his determination to make his services of the greatest possible value to the people of Iowa and elsewhere. On returning from a visit to Cuba, he worked, in the space of nine consecutive months, one thousand, three hundred and thirty-two hours more than is commonly required of a professor. During that period he also attended and spoke at some 172 meetings and "hikes." When out on the road he was constantly collecting botanical material for the College. Up to that time (October 1930) he had made a weed survey of more than half of the counties of the State, along the same lines as the Soil Survey. Incidentally, he made a study of the honey plants, which he incorporated in his useful book on that subject.

His demonstrations of destruction of weeds were extensive and instructive. For instance, he completely demonstrated the destruction of the European Morning Glory, or "Creeping Charlie," quack grass, and Canada thistle, with sodium chlorate. More than thirty years ago he advised farmers how the pestiferous morning glory might be eradicated, and he believed that had they followed his advice, there need have been no trouble with it today. These activities entailed a great deal of correspondence and necessitated the writing of many newspaper articles and the answering of innumerable questions pertaining to economic botany, pollination of flowers, and the identification of weeds and poisonous plants.

Dr. Pammel even conducted numerous Sunday-hike parties in the parks of Iowa, and he made an interesting and impressive innovation by opening them with religious exercises before delivering his address on Conservation.

At many places he also made public exhibits of weeds. One of these, at Ames, showed the plants used by the North American Indians, and another, of Bible plants, was followed by a descriptive address regarding them, and an acknowledgement of the contribution people of the Bible country made to our civilization.

Considering his splendid and successful efforts for the establishment of State parks, it is creditable and fitting that one of them was dedicated Pammel State Park. Space does not permit us to mention every example of the tremendous energy, enthusiasm,

and perseverance of Dr. Pammel in the furtherance of his special subjects and enterprises; but in conclusion, we are glad to add the following appropriate words of an address delivered by Dr. Morehouse of Drake University on the occasion of the dedication of Pammel State Park:

"Iowa has had comparatively few outstanding scientists. It is not apropos to enumerate them at this time; but no matter how long the list, or how selective the group, or whatever criteria applied, Dr. Pammel is certain to a star position therein. Proof of my statement is found in the star indicating his preëminence in 'American Men of Science.' After enumerating his achievements, characteristics, and abilities, his work as a teacher receives the greatest weight in the summation of his character. . . . He exemplifies the ancient adage: 'In Nature's infinite book of secrecy, a little I can read.' Intellectual honesty has been his guiding principle. His great passion is to disseminate knowledge. He successfully exalts his subject and the art of teaching. His kind, sympathetic nature, his clear succinct exposition and his determination to master the subject-matter integrate to make a teacher comparable to Mark Hopkins, Louis Agassiz, and Asa Gray."

Dr. Pammel has left a glorious record treasured in the hearts of all who knew him and profited by his work. We hope that some day in the near future it will be graven on an imperishable monument erected on the campus of Iowa State College or in Pammel State Park.

Fertilizers and Disease Control

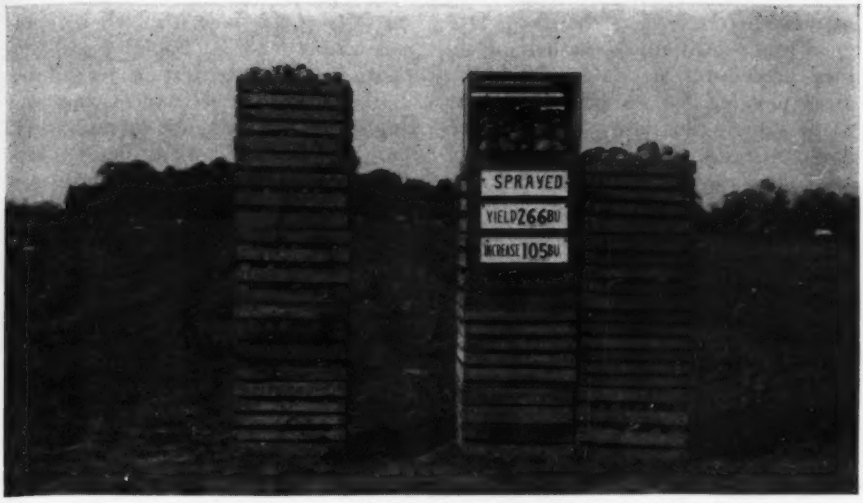
(*From page 25*)

It is at once apparent that the increase consisted principally of the higher grades. The expenditure of $7.99 for potash returned $92.33 to the grower. An important factor in this increase was the scarcity of black fire, a physiological disease, in the potash plot. The lower leaves in the plot receiving no potash were severely affected by this trouble.

Some crops like peas when planted on soil infected with the root rot organism are able to withstand the attacks of diseases when heavy applications of fertilizer are used. Sugar beets are able also to better withstand attacks of root rot when properly fertilized.

If profitable yields are to be secured from applications of fertilizer, certain other diseases must be controlled either by exclusion or by protection with fungicides. When virus diseases like mosaic infect a crop, growers fail to get the expected response from fertilizer applications. Sometimes the growers are unaware of the presence of these diseases and thus conclude that fertilizer is of little value or caused a reduction of yield. Diseases reduce yields and lower quality as well.

Plants must be healthy if responses are to be obtained from better crop production methods. This is not only true of tobacco troubles, but equally true of cereal smuts, potato virus diseases, blights and hopperburn, tomato blights and wilt, melon leaf spots and bacterial wilt, raspberry mosaic, curl and anthracnose, and other diseases. One can aptly compare fertilizing healthy and diseased plants to feeding healthy and tubercular infected cows. No good dairyman would expect a sick cow to pay big dividends on purchased concentrates. Neither should plant growers expect big profits from



Increases in yield of more than 100 bushels per acre frequently can be credited to spraying.

applying nutrients to sick plants.

Frequently we find that results similar to those obtained in Ohio on potatoes emphasize how fertilizers and disease control must go hand in hand. Proper spraying increases the yield by protecting the plants, thus permitting them to utilize to the fullest extent the nutrients supplied in the fertilizer. Increases in yield of 100 bushels or more per acre as shown in illustration II are not uncommon. In fact each crop usually has one or more serious diseases which must be successfully combatted in order to obtain profitable yields.

For Alfalfa Apply Limestone Well in Advance of Seeding

(*From page* 26)

that on the cabbage land the limestone had had sufficient time to correct acidity, while that applied in the spring ahead of alfalfa had not had sufficient time to accomplish its work.

Numerous instances have been noted where alfalfa did poorly on soils of rather high lime requirement, even though the limestone applied should have been sufficient. Almost invariably, however, it develops that the limestone was applied but a short time before seeding alfalfa and so had had insufficient time to correct the acidity.

Even though it is more tolerant of soil acidity than alfalfa, red clover responds to the application of lime some months in advance of seeding time. For red clover if more than one ton of limestone to the acre is needed, it pays, when reasonably convenient, to put it on during the preceding fall. The more expensive forms of lime, burned or hydrate, owing to their quicker action, need not be applied so far in advance of seeding legumes. However, these quick forms of lime also must be mixed thoroughly with the soil in order to give the best returns.

As a result of such observations and experiences, farmers are advised to apply limestone on soils needing two tons or more to the acre for alfalfa a year

or more before seeding this crop. It is good practice to apply one-half of the lime needed for alfalfa in the spring after plowing for an intertilled crop to be grown that year. During seedbed preparation and cultivation of the crop the limestone becomes intimately mixed with the soil and so does its work. After plowing in the fall or early the following spring the rest of the limestone needed is applied. While making the seedbed for alfalfa or a nurse crop this lime is mixed with the soil where it corrects acidity and thus completes the preparation for alfalfa.

The use of limestone in this way applied well in advance of seeding the crop has produced many acres of excellent alfalfa. It is fully appreciated, however, that liming regularly for clover in short rotations over a period of years together with an adequate application of lime direct for the crop are the ideal preparations for alfalfa.

Tomatoes for Canning

(*From page* 22)

Date Planted May 22, 1930
Date Harvested August-September

Plot No.	Fertilizer Treatment	Yields per Acre (tons)	Value per Acre @ $11	Cost of Fertilizer	Net gain for Potash
1	1,000 lbs. 2-12-0	9.8	107.80	14.18	....
2.	1,000 lbs. 2-12-6	10.9	119.90	17.48	8.80
3.	1,000 lbs. 2-12-12	12.5	137.50	20.75	23.13
4.	1,000 lbs. 2-12-18	11.7	128.70	24.05	11.03

Fertilizer Costs:—2-12-0 = $28.35; 2-12-6 = $34.95; 2-12-12 = $41.50; 2-12-18 = $48.10.

Crop Prices:—$11.00 per ton flat rate.

Remarks:—The crop matured early and Mr. Tickle had the first load ready for the canner. Due to dry weather his yield was cut slightly, but he made his last picking about September 25, with the last picking a very large one. Unfertilized tomatoes were still going in to the canner late in October, but Mr. Tickle made his entire crop in about 30 days and avoided all danger of frost.

So all in all there is little opportunity to hedge in the matter of applying commercial fertilizer to the canning tomato crop. It is rather a matter of finding out the requirements which will best fit each special case as it confronts the tomato grower. Certain general recommendations can and always will be made, and with these as a guide the progressive grower will proceed to test and retest until he finds the analysis and rate per acre which shows him the maximum returns. The minimum rate per acre at present is about 500 pounds. It is also fairly certain that those who use less fertilizer per acre and those who use none are paying in reduced yields for their failure to invest in this kind of plant food. It is possible to apply 500 to 700 pounds of a commercial fertilizer per acre and reasonably expect to obtain a real profit on the deal after the cost of the fertilizer and the extra cost of applying it have been deducted.

Narcissus Production

(*From page* 17)

of soils in the Northwest, but most of the planting will be found on sandy loam, silt loam, and muck soils with the major part of the acreage on the loams. The growers find the muck soils, if well drained, especially desirable for sizing up the smaller bulbs.

Hundreds of the hardy varieties are found in this section, but only a few are grown in quantities. The principal varieties arranged according to their present importance are King Alfred, Golden Spur, Emperor, and Victoria. Other prominent kinds include Von Scion, Sir Watkins, Spring Glory, Minister Talma, and Glory of Sassenheim.

Most all of the American growers have adopted the row system of planting. They feel the wide Dutch bed involves too much hand labor. In the furrow, which is opened by double moldboard plows, the bulb grower may set one, two, or three rows of bulbs. The twin row, with the individual rows about five or six inches apart, has been the most commonly adopted. It is usually three feet from the center of one pair of rows to the center of the next pair.

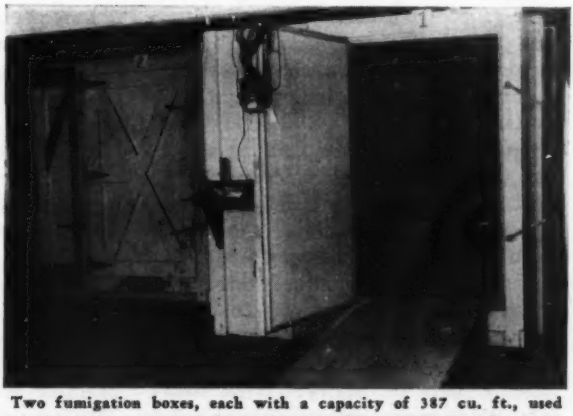
Some of the bulb men scatter the fertilizer in the bottom of the row and rake it in before placing the bulbs. Others scatter the fertilizer on the soil of the half-filled furrow above the bulbs. Fertilizer practices vary, but the 3-10-10 and 3-10-7 mixtures are the most common commercial fertilizers applied to the loam soils. For muck soils a 1-10-10 analysis would be satisfactory. These are scattered at the rate of about 1,000 pounds per acre of bulbs. On the loam soils it is a rather common practice to distribute 300 pounds of some nitrogen fertilizer along the rows early in the spring.

Manures are often applied to the green manure crop which is turned under in the spring before the bulbs are planted the following fall.

As soon as the fall weeds start growth, the soil is gradually worked in over the rows until by midwinter there is a good ridge over the bulbs. During the spring and early summer, the ridge is worked down, thus keeping the rows fairly clean. One or two row weedings by hand are usually sufficient. The centers are kept clean by shovel cultivators.

The nematode or eelworm and the two bulb flies are the only pests of importance. The former is eradicated by giving the bulbs to be planted the standard hot-water treatment at intervals. Crop rotation is also of value. The bulb flies are controlled by fumigating the planting stock.

Harvesting starts as soon as the tops have turned yellow. A few fields are still dug with forks or small shovels,



Two fumigation boxes, each with a capacity of 387 cu. ft., used by the Puget Sound Bulb Exchange. (Note false slat floor, the pans on the side of box in which the Calcium Cyanide is spread, gas mask, and fan.) Courtesy U. S. D. A.

but all the larger growers use modified potato diggers or similar machines constructed for this special purpose. The bulbs are placed in large shallow trays or baskets and hauled to well-ventilated sheds where they are cured two or three weeks before grading starts.

Grading consists of sorting the bulbs into three general classes. These are the over-sized bulbs which are used for propagation stock, the medium-sized bulbs that are sold for forcing in the greenhouses and for yard planting, and the smaller sizes to be planted back to size up for future sales. Later, both the salable stock and the planting stock are resorted into various sizes. All defective bulbs are destroyed.

Pacific-Northwest-grown bulbs are sold throughout the country mainly by bulb salesmen. In this they are following the same general practice as established by the European bulb growers. These salesmen, whether sent out by the associations or larger growers, call on the bulb dealers, chain stores, and the larger greenhouses. Orders are taken during the winter and spring months for delivery the following fall. The smaller independent growers who usually carry a large number of varieties sell direct to the customer, either by the buyer calling at the farm or through a catalog.

Other bulbs now being grown in this section but in much smaller numbers than the daffodils are the bulbous iris, tulip, hyacinth, and various lilies.

The one weak point is that the industry has been built up under the protection given by the Federal quarantine. Should the Government see fit to remove this, it would be difficult, as yet, for the smaller American growers to continue at a profit. Given time to learn the business, the American grower should be able to meet foreign competition, if necessary, and then the future development will depend on quality of the stock offered and the general market conditions.

Green Manuring in Germany

(*From page* 44)

able rotations of crops.

In most of the territory of Germany in which green manure crops are grown, the potato is the most valuable crop. It usually happens, therefore, that potatoes follow the green manure. Furthermore, the larger part of the stable manure is applied to potatoes.

On one farm in Brandenburg which was visited in the summer of 1930, a rotation followed on the lighter soils was as follows: 1, rye; 2, lupines as green manure; 3, potatoes. On the better and heavier land of this farm the following rotation was followed: 1, rye; 2, rye, with serradella as companion green manure crop; 3, potatoes; 4, oats or barley. This four-year rotation is sometimes extended to a five or six-year rotation by seeding clover with the barley or oats. Another rotation followed in this section on the better soils is as follows: 1, rye or wheat with serradella; 2, potatoes; 3, oats or barley.

It is probable that under many conditions it pays better to harvest a crop for seed or forage for home consumption than to utilize it as green manure, assuming that the crops so utilized are efficiently handled and the resulting manure properly conserved. Further, some observers feel that green manuring is somewhat on the decline in Germany, one cause assigned being that the cost of plant food in commercial fertilizer is less than formerly. There are many localities in that country, however, where the practice of green manuring undoubtedly pays, and we may expect that it will continue in these regions for many years to come.

Better Sweet Corn

(*From page* 10)

$22.50 per acre for the respective plots.

These demonstrations confirmed the diagnosis of the Hoffer stalk test in every case. The plots were given this test again in 1930 and showed that the extra potash had materially reduced the amount of iron in the nodes of the corn plants.

In 1930 the Hoffer stalk test was used on 138 sweet corn fields in central Maine. This work indicated that 16 per cent of the fields could have profitably used more nitrogen, while nitrates were ample in 84 per cent of the fields. Where fertilizers containing less than 7 per cent potash were used, 23 per cent had normal nodes, 45 per cent had medium amounts of iron, and 32 per cent had heavy iron. Where fertilizer with over 6 per cent potash had been used, 34 per cent of the nodes were normal, 58 per cent had medium amounts of iron, and only 8 per cent had rather heavy iron. These latter cases were where heavy applications of extra nitrogen had been made during the summer.

An Industry Rebuilt

(*From page* 9)

certain melons which differed in appearance from the rest and which did not seem to be infected with the wilt. These melons apparently were the results of crosses with other varieties. This was the first definite step toward development of a resistant strain. Seed was saved from the resistant melons and they were grown in the years following to determine if their resistance was inherited. From those melons have been developed two of the new resistant varieties grown on several farms the past season. They are the results of continuous inbreeding, or self pollinating, of some of the plants grown from the seed found by Dietz and Elmer. These choice selections are known officially on the records as "Iowa King" and "Iowa Belle." Iowa King has been inbred for five years and Iowa Belle three years.

Iowa Belle is a round melon of large size with tough rind and with sweet, crisp flesh which will delight growers generally throughout the United States.

The third newly developed variety, "Pride of Muscatine," was produced by planting a small field with commercial Kleckley seed and self pollinating literally thousands of flowers. This work was not done in the usual routine way often thought of in connection with scientific research. All of the self pollination of the flowers had to be done in the gray dawn of morning while the rest of the world slept. Only between 4:30 and 6 o'clock in the morning were conditions right for proper selfing. The flowers previously had been bagged with sacks before they opened to keep out any foreign pollen. Then when the flowers were open and pollen had formed on the stamens, the workers dragged themselves out of bed before daylight and started to work. At this time the chill night air had checked the work of insects so that no other agencies were working to carry pollen; only the pollen transferred from the staminate flowers to the pistillate flowers of the same plant by the scientists would have any part in this production scheme.

Nor were resistant, desirable varieties produced wholesale by this method. The disappointments outnumbered the successes a thousand to one. Many of the plants died and only four

small misformed, ugly-looking melons of the thousands which were "selfed" survived. In 1928 seed from these survivors was planted again on rich soil. One of these proved to be superior to the others and was grown in larger quantities in 1929 so that more extensive tests of its resistance could be conducted. Thirty melons were obtained in 1928. From these 30 melons, 125 pounds of seed were produced in 1929, and the inbreeding was continued to "fix" the type and resistant qualities. Twenty-two acres were planted from Pride of Muscatine in 1930.

These melons have been selected on a commercial as well as pathological basis. Pride of Muscatine has wilt resistance, a tough, thick rind, and fine edible qualities which make it even more desirable than its popular ancestor. Iowa Belle has from one to five per cent higher sugar content than many melons now grown commercially.

Although different men have worked on the problem of developing these resistant varieties, one aim has been uppermost at all times. With machine-like precision and dogged determination the plant pathologists have kept their eyes steadily on the goal of a variety which would resist the little organism which causes wilt. At no time has the project been allowed to lapse. Although the early workers have secured doctor's degrees and have gone to better positions, the work has gone steadily forward, though it was sometimes slow and frequently disheartening.

More than 3,600 pounds of the Pride of Muscatine seed, 700 pounds of the Iowa King, and 125 pounds of the Iowa Belle were produced in 1930. About 500 pounds of this will be held back to guard against possible emergencies such as an unexpected crop failure in 1931, and the other 4,000 pounds will be sold to commercial growers for planting 4,000 or more acres.

In addition to the three varieties which are now being offered for commercial production, the Experiment Station workers have under observation about 125 different pure lines of melons which they are still testing. Some have been developed through crosses of the three proved selections and others are a combination of these

Thirteen hundred melons averaging more than 20 pounds each, or 13 tons, were raised on the two-acre yield shown above. The crop in 1924 was a total loss because of wilt, but for the last five years the field has produced the wilt-resistant types being developed by the plant pathologists. The melons shown are the new "Pride of Muscatine."

crosses with commercial varieties. Some are results of crosses of commercial melons with stock citrons which are now producing red, sweet-fleshed fruit. These latter crosses give promise of becoming valuable in the future.

The future for the melon grower is rosy. Producers in southeastern Iowa recently formed the "Melon Growers' Association of Iowa" which will have as its purpose the distribution of the wilt-resistant seed and rejuvenation of the industry. The secretary of the association, which is incorporated under the laws of Iowa, is a half-time employee of Iowa State College. The association plans to maintain a supply of certified, wilt-resistant seed so that growers will be sure that they are getting resistant seed. Seed will be sold only to members as long as they require the full supply. As soon as there is a surplus of seed, it will be sold to growers outside the association. Certification will be made by the secretary who will inspect all fields from which certified seed is to be harvested and sold. D. V. Layton, who has been helping with the field experiments, is the secretary of the new association.

And in the meantime further work on development of other resistant varieties will be done. The purpose of this continued work is to develop, if possible, better varieties than those now available. The three new varieties are commercially acceptable, but it is thought that varieties having still greater resistance and with more intense redness of flesh and black seeds, fancy points from the standpoint of the commercial trade, may be developed.

Mr. Wilson, who had been county agent among the truck growers previous to taking charge of the field work two years ago, knows the growers. He knows they are interested and want to grow wilt-resistant melons.

"The growers have found out what melons are worth to them since they have been unable to grow them," Mr. Wilson says. "They know they are the most profitable crop they can grow. In addition to that they now have marketing facilities which they did not have 10 or 20 years ago. Trucking has developed to a practical stage while growers formerly hauled the melons out in wagons. I expect to see the melon industry gain in the next five years its status of 20 years ago."

Profitable Trees

(*From page 5*)

Of the 16 orchard soils tested, 12 were apple and 4 peach. For phosphoric acid content these soils ranged from no available phosphoric acid to 96 pounds per acre. The available potash ranged from 36 to 266 pounds per acre. The average of the 12 apple orchards showed 16.2 pounds of available phosphoric acid and 164.6 pounds of available potash per acre, while the peach soils averaged 34.4 pounds of phosphoric acid and 145 pounds of potash.

In all but three of the orchards, which are considered to be among the best in southern New England, the fertilizer treatment for many years has been nitrogen alone. Comparing these with the three orchard soils that have received complete fertilizer for several years we get the following results:

	Plant Food per Acre	
Fertilizer	P_2O_5	Potash
Complete	57.2	250.0
N. alone	12.2	138.8
Difference	45.0	111.2

These tests indicate that where nitrogen has been the only fertilizer treatment the supply of available phosphoric acid and potash in the soil is very low. This may be the reason why clover and the other legumes do not make a satisfactory growth in many orchards. These valuable soil-improving crops need far larger amounts of available phosphoric acid and potash than these soils contain. Acidity tests of these soils show that nearly half of them also are low in lime.

Fertilizer tests were started in these orchards three years ago. Yields of fruit have been obtained, but this is not a long enough period to give a fair picture. It is, however, safe to say that the yields so far indicate a very close relation to the available plant food in the soils.

Knowledge Precedes Action

(*From page* 12)

section have adopted the slogan of the National Paint Manufacturers Association, "Save the Surface and You Save All."

Due to the efforts of the Chamber of Commerce, the Henryetta District is known as a one cotton variety community. Oklahoma Triumph 44 No. 11 strain is grown by 95 per cent of the farmers. Demonstrations conducted proved this variety gave a high dollar return per acre. This variety plus liberal applications of commercial fertilizer produced a superior staple last season. A demonstration conducted on the W. P. Rorex Farm last year showed that no fertilizer gave a yield of 426 pounds seed cotton per acre, but when 200 pounds of 6-8-10 were applied, the yield jumped to 609 pounds per acre. More than 3,000 bushels of certified cotton seed were planted last year.

Some six years ago the Chamber of Commerce started a demonstration vineyard to find out what variety of grapes and what system of pruning were best adapted to the Henryetta District. More than 50 of the leading varieties of grapes were planted. During the third year of the demonstration the vineyard attracted so much favorable comment and had such potential possibilities that the A. and M. College at Stillwater took over the vineyard for experimental purposes. Field days are held annually, and grape enthusiasts come from quite a distance to study the vineyard and gain information.

Demonstration tours have been held each year and outstanding demonstrations of pure seed, terracing, and the use of fertilizers are visited. The 1931 program was started off with a Pure Seed Show and Fertilizer Meet that attracted State-wide attention. Leading pure seed growers from 15 Oklahoma counties had exhibits on display. Fertilizer representatives vied with each other in putting up attractive booths. Agricultural experts from three States appeared on the program. A feature of the day's activities was a picture show where outstanding demonstrations conducted in the district in 1930 were shown. The pictures told an interesting and convincing story concerning the importance of planting pure seed and using commercial fertilizers.

In many instances the demonstrator was present to corroborate the information appearing in the picture. This meeting proved to be the biggest boon in boosting the pure seed and fertilizer movement yet undertaken by

Recently built roads opened up approximately 300 square miles of trade territory and gave the farmers a chance to participate in the program sponsored by the Chamber of Commerce.

the organization. One direct result of the show was the establishment of a potash distributing point at Henryetta.

To give assistance in production was not enough, and so the Chamber of Commerce during the past few years has been responsible for building approximately 30 miles of roads opening up almost 300 square miles of territory. Twice every year the business men of the city hold good-will meetings in every well-organized community of the district, spreading the gospel of pure seeds and commercial fertilizers.

As the proof of the pudding is in the eating, so the results of the agricultural program are measured by the agricultural displays at the Henryetta District Fair. Although the fair is only six years old, it ranks today as one of the leading fairs of Oklahoma. Last year 15 communities had collective exhibits on display. The exhibits were sufficient evidence that the program of pure seed and the judicious use of commercial fertilizers had been successful. Knowledge preceding action has proved to be the right course in this instance.

Piety Plus

(*From page* 4)

not be squandered. It consists of a few old theological memoirs by pious men of an earlier day. They came into the possession of the family through a distant Michigan relative who was himself a preacher among the pioneers. I presume he married more folks for nothing and used up more baptismal water out of frozen creeks than history will ever record. Anyhow, he "kept" well, as the old lady said of an elderly friend, and came through the orthodox ordeal without losing his pink cheeks or his gracious and honest smile.

Oftener than you might suppose I glance at these volumes he left behind. Two or three of them are hard-

boiled and copper-riveted expressions of faith, with no concessions. On the other hand, they are not wishy-washy, which is a comfort sometimes. Two volumes are there by Rev. Alfred Brunson, born in Danbury, Connecticut, in 1793, which are decidedly human documents. He was a soldier with Perry and Hull, mentions Put-in-Bay and Detroit, and makes you see Chief Tecumseh quite clearly. Later he went into the Western Reserve of Ohio as a circuit rider, and finally ended up in Illinois and Wisconsin. As a boy I read his escape from the wolves and his fights with the rowdies with zest, although passing up some of the hell fire, more useful to me in later years.

THERE is another hairbreadth religious book on my shelf by that ancient "primate of the prairies," Peter Cartwright. He came from Virginia and Kentucky into the Sangamon country of Illinois when Abe Lincoln split rails and courted Ann Rutledge. He was a foe to slavery, but opposed the ardent and mistaken efforts of some abolitionists.

Cartwright says in his book for 65 years he served the Lord in the wilderness. Sangamon county folks may like to hear that he received $60 a year in their parishes and could almost perish on it. Yet he was a redoubtable and practical man, for he winds up by saying that he and his home-spun help-meet raised a family of seven living children on that small dole. When he wrote his memoirs in the seventies, Cartwright had 50 grandchildren, 37 great-grandchildren, and one great-great-grandson. Furthermore, lest we get any wrong ideas as to his example, it happens that three of his daughters married Methodist ministers. This is not a boost for that creed, but evidence that chicken dinners had some effect.

Sandwiched in between Cartwright and another sacred set I find a brown leather volume printed in 1833, which contains some of the longest and driest sermons ever preached by John Wesley. I have counted them and find 56 in all, given on sundry occasions to patient audiences. I presume they are splendid ones, but the type is rather fine. I am not able to discuss them intelligently. I still admire the steel engraving of the noted divine, and have got no further after forty years.

Then comes that modern evangelist and metropolitan social worker, Rev. Samuel Fallows, a Chicago bishop. His story is told by a daughter, and it relates his conversion at a camp meeting, his adventures as a chaplain in the Civil war, and sundry worthy human reforms, including home-brew parlors for the poor, which this most kindly and able minister instituted during his sojourn in the city lately bossed by Bill Thompson. I almost forgot T. DeWitt Talmadge and his trip around the world, but you won't care for more.

On the whole, my mine of pious literature pans out into pretty good

reading. I don't know if you have anything to trade with me which would make it better, for laymen I mean. I have a small collection of science works also, but I do not keep them separated from the religious volumes on grounds of incompatability. I refuse to enter any arguments over the discrepancy between scientific discovery and religious fervor and mysticism. If others who likewise lack the background for it would refrain from pestering people with such riddles, it would leave the field open to folks with ability—and they are too busy to do it!

PIETY on paper and piety plus in action are such different phases of life that we may consider them without invoking any dogmatizing schisms. For I presume that our well-being spiritually and our mutual hereafter soulfully may be considered enough of a personal and relevant matter to bear scrutiny by common eyes. Churches are like clothes anyhow,—we don't all wear the same cut and pattern except in prisons. If we are decently dressed and offend not, that is the function of clothes. In a let-well-enough-alone way, that is also the respective function of churches. It's what we do on week days with what we absorbed on Sunday that settles whether or not we are really good members on the following Sabbath.

Actually, I believe that most younger people attend their favorite church nowadays to get inspiration. The lecture style of sermon in a modern manner appeals to them, while old time dissertations, minus human touches, are less effective.

The old custom of sleeping through services does not prevail so commonly as of yore. For one thing, the programs are shorter and the audience is not so physically weary from outdoor toil. I am at a loss to know definitely whether modern preacher craft may be credited with reducing the snore percentage to any extent, providing we gave them as much time to expatiate as they allowed Rev. Wesley and Jonathan Edwards.

"Getting the power" and prancing with shouts is another mark which has entirely gone from our services. We must be living in a sort of middle ground of emotion—too wide-awake to get drowsy over sermons and too conservative and dignified to do handsprings to the mourner's bench.

While those vehement elders relished the exhibitions of violent bodily contortions during sprees of "the power," it is likely that they would abhor turning our churches into select dancing clubs or athletic carnivals. Personally, I can see no reason why a man should not dance where he prays, or make a difficult basket shot where he contributes to the collection box. We dance sometimes in our homes and practice nifty shots with golf clubs on our lawns. The real danger lies in doing dancing or praying to excess, or in being hypocritical about either.

And as for card playing, who has a more perfect right than a minister, whose work is dedicated to sealing affairs of hearts and diamonds, as well as the final ceremony of spades? And sometimes he needs the clubs, too, although they are harder to make a game in for him.

THIS leads naturally to piety plus. Just what that "plus" might be depends on each one of us. Maybe that's why some preachers can't quite seem to deliver to suit.

Recently there came to our church a noted liberal doctor, one whose utterances on human welfare as opposed to greed and machine dominance have made a national reputation. We expected to be inspired and routed directly to a means of doing some things ourselves that might straighten some injustice. We sat up stiffer than we ever did beside our parents and waited —in vain—for the spark of crackling fire.

On the following Sunday the gritty young divine who occupies our pulpit undertook to fill the void which had

been left gaping by the noted liberal. In doing so, and doing it decidedly well, I "wot not" that he offended some of the purse-proud parishioners. If any of them had corns they must have felt as though a tractor had traveled over them with extension lugs. As I am just proud and not purse-proud, it rather tickled me. Trusting I am no Pharisee, let me enjoy it again with you.

HIS was an economic sermon, on practical salvation for bread-winners while residing in the flesh. That's why it sounded pertinent to some of the sequestered ones, who want preachers to dwell forever on the world to come.

Among his points were these: 1. We should plan production with respect to consumption. He said that if America was smart enough to keep up with scientific progress, it should be keen enough to keep step with economic needs. 2. We should develop an adequate system of employment exchange. He said that if we can handle ten million shares daily in a stock exchange we ought to be able to do the same for labor. 3. Publicity for all incomes was advocated, particularly improving wage scales by "pitiless publicity for pitiful pittances." 4. Universal sickness, old age, and unemployment insurance was suggested. Here he stirred up more fuss.

In the fifth place he asked for more development of public utility control by public ownership, together with adequate control of self-interest to keep it within decent social bounds. He ripped right into many of the old sacred cows and dehorned them.

No doubt many of us who heard that sermon came away with mixed opinions or aroused prejudices. I do not insert these things here to start any debate, but merely to indicate that some ministers can get a little "plus" into their piety, or make a game in clubs.

We often hear it said that the old rip-snorting editorial writers have faded out into syndicated strips of balderdash, which means that the editorial pages are less human and convincing, less apt to develop leadership. Maybe some of the ministers have equally answered the call of standardization.

But now that summer is upon us with its tantalizing calls to the greens and the gardens, it takes a pretty good performance at church to keep simple-minded men like myself from straying away into the ozone. Returning traits of boyhood beckon from every bird's nest and whisper from many brooks.

Quite lucky indeed are those who have a minister ready to go fishing or golfing, nature faking or hiking. Here is yet another piety plus aspect which substitutes the potent love of living for the dreaded and impotent fear of damnation.

I HAVE no shred of doubt that if I step up to Saint Peter as he stands by the shiny portal (providing of course) and remark to him that the weather is first rate and that the fish should be biting right smart, he will throw wide the entrance, lower the drawbridge, and let me pass without glancing at my visé. No man who has ever worked with line and sinker will lose his camaraderie.

And barring the use of saxophones, I should not object to an angel with a uke. This is said in no spirit of jazz at Jerusalem, but with a well-grounded conviction that we may be credited up yonder for our plus as much as for our piety.

Which does not at all conflict with the doctrines of my aforementioned library—that meanness is *minus*.

Aunt Hetty: "Sakes alive! I don't believe no woman could ever been so fat."

Uncle Hiram: "What y' readin' now, Hetty?"

Aunt Hetty: "Why, this paper tells about an Englishwoman that lost two thousand pounds."

ON THE STREET CAR

"Madam," he said, "will you please get off my foot?"

"Put your foot where it belongs," she replied shortly.

"Don't tempt me, Madam, don't tempt me," he countered.—*Postage & The Mailbag.*

An American lawyer was sitting at his desk one day when a Chinese entered.

"You lawyer?" he asked.

"Yes. What can I do for you?"

"How much you charge if one Chinaman killum other Chinaman, to get him off?"

"Oh, about $500 to defend a person of murder."

Some days later the Oriental returned and planked down $500 on the lawyer's desk.

"All light," he said, "I killum."—*Sprague Advocate.*

"That reminds me," said the man who watched the steam shovel at work, "I'm to play golf tomorrow afternoon."

FOUND

Three young men from college walking down the street saw a very old gentleman coming toward them; wishing to display a bit of college humour, the first one said, "Good morning, Father Abraham." The second said, "Good morning, Father Isaac," and the third said, "Good morning, Father Jacob." The old man gazed at the three for a moment, then replied, "Young men, you are mistaken; I am Saul, son of Kish, in search of my father's asses, and behold! I have found three of them."

NO USE TRYING

Johnny: "I didn't bring an excuse for being absent yesterday 'cause ma was too busy to write one this morning."

Teacher: "Then why didn't your father write one?"

Johnny: "Shucks, he's no good making excuses. Ma catches him every time, an' you're smarter'n ma."

"Margaret could have married anybody she pleased."

"Then why is she still single?"

"She never pleased anybody."

MADE GOOD

"What did your boss say when you told him it was triplets?"

"He promoted me to the head of my department."

"What department are you in?"

"Production."—*The Yellow Strand.*

"But surely," urged Jones, "seeing is believing?"

"Not necessarily," replied Brown. "For instance, I see you every day."—*Tit-Bits (London).*

NOT GUILTY

Judge O'Flaherty—"Haven't you been before me before?"

Prisoner—"No, y'r honor. Oi niver saw but wan face that looked loike yours, an' that was a photograph of an Irish king."

Judge O'Flaherty — "Discharged. Call th' nixt case."

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